



Department of Biomedical Engineering

*... to promote learning and discovery
that integrates engineering and life sciences
for the advancement of human health...*

Letter from the Chair



Dear Biomedical Engineering Alumni and Friends:

I am pleased to send our Spring newsletter and describe how we are continuing to make progress developing our new Department. We are looking to hire additional faculty members, and our proposal for a new undergraduate major -- to be fully described in our next issue -- has

almost completed the review cycle. It has now been approved by the Ohio State Board of Trustees, with final approval pending from the State Board of Regents and the State's Chancellor. Although we do not know for certain when we can accept the inaugural class of up to 25 students, we are prepared to begin as early as Autumn 2008.

We have approved a new Charter for a Departmental Board of Advisors, and have selected **J. Fredrick Cornhill**, currently the Director of the Institute of Biomedical Engineering at Oxford University, and the past Director of the OSU Biomedical Engineering Center, as our Chair for the new Board. We will be working with him this year to populate the Board with members that include alumni with expertise in industry, academia, and/or medicine. If you would be interested in being considered for a 3-year term, please let me know, and I will forward your information to Dr. Cornhill.

In order to help us achieve our department's missions we will also continue to depend on help from our alumni and friends. As I wrote last year, there are many ways that you can help to fuel our successes. 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 continue to introduce our faculty members, describe our recent Biomedical Engineering Conference that highlighted student research, and briefly report

on our recently completed renovation project to build an undergraduate teaching lab, as well as to list some recent faculty and student achievements. Additional information is available on our website: <http://www.bme.ohio-state.edu/>.

I continue to meet many new people on campus, and would especially like 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.

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Congratulations Professor Ruegsegger! On May 2, 2008 Mark Ruegsegger, PhD (on left) was presented the **Herman R. Weed Excellence in Teaching Award** by **Keith Vogt, MD/PhD** student (on right). This award was established in honor of former department chair and founder of the Biomedical Engineering Center at OSU, Herman Weed. It is given annually to a BME faculty member chosen by BME students to recognize excellence and innovation in the classroom. Dr. Ruegsegger is an Assistant Professor of Practice in Biomedical Engineering and Director of BME Undergraduate Studies.

MEET THE FACULTY

**Alan Litsky, M.D., Sc.D.,
Associate Professor**

How long have you been at OSU and what titles have you held? I came to OSU directly from my graduate program in 1987 to start a research program in Orthopaedics. I was invited to join the BME faculty about two years later. I've been at OSU for almost 21 years. I have seen lots of changes in its direction and its focus. In addition to a joint faculty appointment in the Departments of Orthopaedics and in Biomedical Engineering, I'm on the faculty of the Interdisciplinary Biomedical

Science Graduate Program, the Division of Anatomy, and the Oral Biology doctoral program. I'm also the Director of the Orthopaedic Biomaterials Laboratory, and the Director of Research for the Department of Orthopaedics.

Who influenced you to become a biomedical engineer? The patients I treated during my medical career and Prof. Robert Rose, my mentor at M.I.T., who taught me the excitement of innovative research and the responsibilities that come with that independence.

Describe your proudest professional moment. One of the best experiences for any faculty member is seeing their students graduate and go on to make their mark on the world. I've been fortunate to work with several students who have made substantial contributions to our field, some in faculty positions, others in industry.

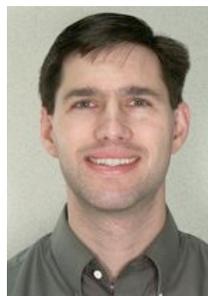
In your role as Director of BME Graduate Studies what do you hope to bring to the department? We strive to build and maintain a Graduate Program that will develop independent, thoughtful researchers prepared to lead the rapidly-evolving frontiers of biomedical research and applications. I'd like each of our students to obtain the necessary breadth and depth, of both knowledge and skills, to actively participate in the field throughout their careers.

Where did you receive your education? A.B. from Princeton University, M.D. from Columbia University College of Physicians and Surgeons, Sc.D. from Massachusetts Institute of Technology.

Tell us a little about your personal background. I was born and grew up in New England. I've been happily married for longer than most of our graduate students have been alive. Sue and I have two college-aged children. Interests outside of engineering include tennis, travel, and sarcasm.

Tell us about your research. My research focuses on hard-tissue biomaterials, particularly for orthopaedic and dental applications. The work in the Orthopaedic BioMaterials Laboratory includes both basic science work such as new material development and more clinical projects such as implant evaluation and testing. One focus has been securing implants to the skeleton. This has included new materials and new mechanical designs. Research projects have included evaluation of a reduced-modulus acrylic bone cement for use in total joint arthroplasty procedures, an interdigitated metal-ceramic composite for improved ingrowth of bone, and a novel muscle-fiber interface approach that might lead to an artificial tendon.

MEET THE FACULTY

**Mark Ruegsegger, Ph.D.
Assistant Professor of Practice**

How long have you been at OSU and what titles have you held? I arrived at OSU in February 2001, when BME was a Center with 5 Faculty. I was hired as an Assistant Professor through the Selective Investment Initiative, with a joint Faculty position between BME and Internal Medicine (Cardiology). As of Fall 2007 my position has changed to Assistant Professor of Practice within the Department of Biomedical Engineering.

Who influenced you to become a biomedical engineer? In high school I was

equally influenced by my father, who worked in a medical environment, and my brother, who was an electrical engineering major in college. Putting the two together, I realized that my interests were at the interface of medicine and engineering...biomedical engineering!

Describe your proudest professional moment. I remember the joy I felt after teaching my first lecture in BME (not that the lecture was memorable). It was satisfying to know that all my previous work had led to this point, where I could be a positive example to students as an educator in biomedical engineering.

In your role as Director of BME Undergrad Studies, what do you hope to accomplish? Since we are starting fresh, as early as this Fall, with a new undergraduate program, I think it is important to set very high goals for the program. Also, we will work to achieve our desired outcome of a program of excellence, where students receive a quality education with unique curricular and lab experiences in biomedical engineering. At the same time, we will need to listen to and be responsive to the students, as they will play a significant role in bringing improvements to the curriculum.

Any memories or BME history to share? I will always appreciate the leadership of Prof. Andreas von Recum, whose persistence and resolve were essential in turning our BME Center into a Department. And when he stepped down as chair, and bought a motorcycle to ride around town in his retirement, I thought that was pretty cool, too.

Tell us a little about your personal background. I was born and raised near Dayton, Ohio. I went to Case Western Reserve University to get my undergraduate and graduate degrees in Biomedical Engineering. I met my wife at Case. Shortly after we were married we moved to Columbus. We have one daughter and a second child on the way! I enjoy sports and I just can't play enough soccer. I play year-round (indoor and outdoor), and when the World Cup comes around, I don't tape the 3 AM games, I set the alarm and watch them live. My wife and I also like to travel...particularly to warm locations.

Tell us a little about your research.

My research focus has been on developing biomimetic coatings to make cardiovascular devices more blood compatible. This research platform has been extended to applications such as stent coatings, polymer graft coatings, and multi-functional nanoparticles (degradable, drug delivery, MRI contrast, plaque targeting).

SECOND ANNUAL OSU BIOMEDICAL ENGINEERING CONFERENCE

The student members of the Ohio State University chapter of the Biomedical Engineering Society organized the second Ohio State Biomedical Engineering conference, held on May 2, 2008 in Bevis Hall. The organizing committee included **Keith Vogt** (chair), **Caroline Haas**, **Becky Janesen**, **Theo Nicholson**, **Jonathan Pillai**, and faculty advisor, **Mark Ruegsegger**.

Students from across campus who had worked on Biomedical Engineering research topics presented their rationale, methods, and novel results during poster presentations. Volunteer judges were recruited from the College of Engineering faculty and from local industry to consider the quality and impact of the research. Winners of the poster session were identified in the six research categories that correspond to the Department's domains of current interest: Bioimaging, Biomaterials, Biomechanics, Bioinstrumentation, Micro/Nano Biotechnology, and Molecular, Cell & Tissue Engineering. The winners were announced as: **Paulo Gotardo**, a PhD student in Electrical and Computer Engineering; **Jonathan Pillai**, PhD student in BME; **James Falk**, undergraduate in Mechanical Engineering; **Daniel Gallego-Perez**, PhD student in BME; and **Mark Stevenson**, PhD student in BME. Monetary travel awards were given to two students. A \$100 award sponsored by the Columbus section of the IEEE-EMBS, went to **Keerthi Shet**, PhD student in BME, for her presentation titled "Surface Coil for EPR irradiation to reduce SAR in Fixed-Field PEDRI." The winner for the overall best presentation was **Dianne Glass**, MD/PhD student in BME, for her presentation entitled "The Deformation Response of Healthy and Diseased In Vivo Human Corneas When Subjected to an Air Pulse." Dianne received a \$200 travel award to help reimburse the costs associated with presenting her poster at a national conference.

In addition to the poster winners, the **Herman Weed** award was presented to **Prof. Mark Ruegsegger** for excellence in teaching in Biomedical Engineering. Also during the ceremony six undergraduate students in Biomedical Engineering were awarded **Kettering Undergraduate Biomedical Engineering Scholarships**: **Greg Davison**, Mechanical Engineering; **Brandon Jonard**, Mechanical Engineering; **Michael Keller**, Mechanical Engineering; **Elizabeth Martin**, Materials Science Engineering; **Cynthia Schwartz**, Aerospace Engineering; and **Carlvin Yu**, Mechanical Engineering. The group was awarded a total of \$33,000 to pursue the undergraduate minor in Biomedical Engineering during the 2007-2008 and 2008-2009 school years.

Poster award winners, pictured left to right are: **Jonathan Pillai**, **Paulo Gotardo**, **Dianne Glass**, **James Falk**, **Daniel Gallego-Perez**, and **Mark Stevenson**.



UNDERGRADUATE TEACHING LAB



As Biomedical Engineering prepares for the upcoming undergraduate program, we are excited to showcase the completed renovations for the Undergraduate Education Laboratory, located in the basement level of Bevis Hall. The nearly 1100 ft² laboratory will be used primarily for the proposed Junior year "BME Domain Courses" and the Senior year "Capstone Design Course." The undergraduate lab is furnished with three islands of chemical-safe countertops with cabinets and shelf systems, two sinks, and a safety shower and eye bath. Included in the laboratory's design is approximately 400 ft² of open space at one end of the lab for flexible modular layouts based on the needs of an individual domain course. In the Fall, we will begin acquiring the lab equipment for the courses that will be offered in 2009-10.

ACHIEVEMENT, RECOGNITION, AND NEWS

B. Rita Alevriadou, Ph.D., Associate Professor, Biomedical Engineering and Internal Medicine (Cardiology) gave a presentation entitled, "Mechano-sensing at the vessel wall: Role of free radicals" on February 22, 2008 at the University of Pennsylvania, Institute for Environmental Medicine. In April, 2008 Dr. Alevriadou gave a talk at Experimental Biology 2008 in San Diego, CA, entitled "Mitochondria, nitric oxide and endothelial mechanosignaling" that was sponsored by the Biomedical Engineering Society.

BME Faculty member, **Alan Litsky**, MD, ScD, Associate Professor Biomedical Engineering and Orthopedics has been elected to the board of The Society for Biomaterials (SFB), and represented SFB at the World Biomaterials Conference in Amsterdam. Dr. Litsky has also been chosen as the OSU faculty representative to the Federal Demonstration Partnership, a cooperative initiative among 10 federal agencies and 98 institutional recipients of federal funds for the purpose of reducing the administrative burdens associated with research grants and contracts.

Biomedical Engineering welcomes new employee, **Cory Matyas** in the newly created position of Undergraduate Academic Advisor for BME.

PhD Alumni, **Jingjiao Guan** (2005) has accepted an assistant professor position at Florida State University in the department of Chemical and Biomedical Engineering.

BME student, **Dianne Henry** and former BME student, **Huikai Karol** will participate in a summer camp for prospective engineers. Organized through OSU Women in Engineering, this program is designed to give High School students an awareness of fundamental engineering research skills.

A presentation by **Allison Spiwak**, BME /PhD student and interim director of Circulation Technology, was awarded the Fellowship Award for outstanding scientific presentation at the American Society for Extracorporeal Technology 2007 annual meeting.

Keith Vogt, MD/PhD student received three OSU awards in 2008: The Mary A. Daniels Scholarship for Student Campus Leadership and Academic Achievement; an Alumni Grant for Graduate Research and Scholarship; the MD-PhD Leadership and Academic Achievement Scholarship.

Materials Science and Engineering student, **Caesar Buie** won second place at the Denman Undergraduate Research Forum for his project, Investigation of NiTi Dental Alloys. Engineering advisors for this presentation were Dr. **William Clark** and Dr. **William Brantley**.

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