Dear Biomedical Engineering Alumni and Friends:

We are pleased to send our Autumn 2013 newsletter and again share news of recent activities!

We had a very successful 2012-13 academic year. In August, just as classes were starting, we received word that the undergraduate program had been accredited by ABET. This was the result of careful planning and sustained efforts on the part of our faculty, staff, and students, and was accomplished in record time—the self study was submitted just after our first graduates from the program (the earliest allowed) in June 2011. We were accredited going forward with the accreditation retroactive to 2010, meaning that all our undergraduates have graduated from an accredited program!

Last year also saw the implementation of another successful planning process when Ohio State changed from a quarter-based academic calendar to a semester-based one. As expected, faculty and students needed some time to adjust, and we look forward to refining our offerings. But we are now on a calendar that improves summer job and research opportunities for undergraduates, and fits better with transfer students and summer activities, including conferences, for most faculty members.

In 2012-13, our undergraduate program finished the planned enrollment ramp and is now “fully loaded.” We will now have approximately 75 sophomores, 75 juniors, and 75 seniors in steady state. We continue to see tremendous interest among the first-year pre-engineering students, with over 200 interested in bioengineering, including biomedical engineering. It will take additional faculty and facilities to accept more students into the major (see below).

Our graduate students continue to win research and scholarship awards, with highlights included in the newsletter. We are currently refining our graduate course offerings to ensure we have appropriate depth and breadth and continue to focus on research and publication for doctoral students.

Faculty members continue to innovate, win competitive funding awards, and publish in high-quality journals. Our productivity and impact continue to rise with faculty publishing an average of 3.6 peer-reviewed publications in 2012, and the average number of citations for previous publications for faculty members is now over 100 per year.

We will continue to seek three or four additional faculty members this year with expertise in cancer imaging, medical device design, regenerative medicine related to spine studies, and spine mechanics. Some of these are parts of cluster-hires in the college, and all relate to the university’s emphasis in health and wellness—one of three discovery themes highlighted in Ohio State’s current strategic plans.

Finally, we are excited by efforts to relocate BME to central campus. During the past year, a feasibility study recommended that we relocate—along with materials science and engineering—in a new or renovated site combining the Koffolt and Fontanna Lab buildings. This opportunity to be located in the heart of the engineering portion of campus is because Koffolt will be vacated once a new building—currently under construction—is completed for chemistry and chemical engineering. Even with our new location, we also plan to have a noticeable presence on the health sciences portion of campus, with wet lab and clinical collaborations focused there. The new location will allow for improved, central facilities for instruction, teaching labs, administration, and research, enabling faculty and students to reach their full potential by opening opportunities for much closer collaborations and program expansion.

Thank you for helping support our continued successes. Gifts targeted to the department 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. (See our “Give to BME” button on our website at bme.osu.edu.)

In addition to financial support, I am hoping that the network of Ohio State alumni and friends continues to help our students find internship and employment opportunities. Please let us know of any opportunities as you find them.

I am always happy to meet our alumni and friends. Please stop by, if convenient, to get a firsthand look at our progress.

Richard T. Hart, PhD
Edgar C. Hendrickson Professor and Department Chair
hart.322@osu.edu

bme.osu.edu
Spotlight on Students

Colton Lloyd Receives NSF Graduate Research Fellowship

Colton Lloyd, originally from Pickerington, Ohio, graduated in May 2013 from the undergraduate BME program at Ohio State. Colton worked as an undergraduate research assistant for B. Rita Alevriadou, associate professor in biomedical engineering and cardiovascular medicine, examining vascular endothelial cell calcium signaling under various mechanical and chemical stresses. Through his research, Colton worked to understand the molecular pathways and mathematically characterize the calcium transients produced when these cells are exposed to fluid shear stress. Throughout his undergraduate years, he also worked as a student assistant in Clinical Engineering Services at Ohio State’s Wexner Medical Center. For his work in research, Colton was awarded both a scholarship from the Undergraduate Honors Committee and a summer honors research scholarship.

2013 BME Annual Awards Picnic

The Department of Biomedical Engineering’s Annual Awards Picnic was held April 19 in Bevis Hall. Department faculty, staff, and students came together for good food and great conversation. This annual event is organized and hosted by the Department of Biomedical Engineering and the Biomedical Engineering Society (BMES), Ohio State Chapter.

The highlight of this event is the awards ceremony. Awards are presented to undergraduate and graduate students in recognition of excellence in academics and leadership. In addition, the Herman Weed Excellence in Teaching Award is presented to one faculty member in recognition by his/her students of exemplary instruction and mentorship in service to students in the Department of Biomedical Engineering. This year’s recipient was Mark Ruegsegger, PhD, associate professor and director of undergraduate education of BME.

This year the department also was excited to unveil a new award to honor a staff member. The first recipient of the BME Staff of the Year Award was Melanie Senitko.

Additional 2013 award recipients are:

UNDERGRADUATE
Junior Outstanding Scholar Award – Brett Geiger
Senior Outstanding Scholar Award – Mitchell Romito
Research Achievement Award – Colton Lloyd
Undergraduate Service Award – Sheheryar Jamali
Senior Leadership Award – Sam Urs
Biomedical Engineering Society Scholarship Award – Allison Guettler

GRADUATE
Graduate Service Award – Tanya Nocera
Graduate Teaching Associate Award – Tanya Nocera

Congratulations to all our accomplished recipients!
Recently, Colton was selected to receive a 2013 National Science Foundation Graduate Research Fellowship Program Fellowship for the first three years of his graduate school research. He was selected based on his outstanding abilities and accomplishments, as well as his potential to contribute to strengthening the vitality of the U.S. science and engineering enterprise.

The National Science Foundation Graduate Research Fellowship Program helps ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity. The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master’s and doctoral degrees at accredited U.S. institutions.

After graduating in May with honors and research distinction, Colton will be attending the University of California at San Diego to pursue his PhD in bioengineering.

Congratulations, Colton, on your selection as a Fellow and best of luck in your graduate studies!

BME Alumnus Receives $1.6 Million for Research Funding

As a graduate student at Ohio State, Hansong Zeng studied in the laboratory for biomedical microsystems through the Department of Biomedical Engineering from 2007 to 2012, and was supervised by Yi Zhao, associate professor in the Department of Biomedical Engineering and the Department of Ophthalmology. Zeng’s dissertation was titled “Bio-inspired inertial sensors for human motion measurement.” During his stay at Ohio State, Zeng published nine journal papers and 13 conference proceeding papers. Zeng was the recipient of several awards while at Ohio State, including The Presidential Fellowship (sponsored by The Ohio State University Graduate School); The Ohio State University Alumni Award; Best Poster Award at the International Mechanical Engineering Congress; a National Science Foundation travel award; and finalist of the 2011 Ohio State Fisher Business Plan Competition.

After his graduation in February 2012, Zeng has been working as a research engineer at Sentient Inc. on medical device design and commercialization. Within nine months of his first industrial position, he has won three industrial research funds as the principal investigator from New York State Energy Research and Development Authority (NYSERDA) and the Department of Defense (DOD), totaling $1.6 million for research and development of sensors and sensing systems.

Congratulations, Dr. Zeng!

Varghese Awarded AHA Pre-Doctoral Fellowship

Juliet Varghese, a graduate student in biomedical engineering, was recently awarded a pre-doctoral fellowship from the American Heart Association. Juliet will work with cardiovascular medicine and radiology doctors Sanjay Rajagopalan, Orlando Simonetti, and Georgeta Mihai to research peripheral arterial disease (PAD). PAD is a narrowing of the peripheral arteries, most commonly detected in the arteries of the legs and pelvis, and affects nearly eight million Americans. Varghese and her fellow investigators will carry out their research by using integrated treadmill stress testing and magnetic resonance imaging (MRI) procedures to evaluate functional capacity, blood flow, and muscle characteristics for those suffering from PAD. It is also their goal to better identify those people who are at risk for critical limb ischemia (CLI) and to develop an improved system for guiding the management and prognostic assessment of PAD patients. The competitive fellowship grants Juliet a two-year stipend worth $52,000.

Congratulations, Juliet!

Brett Geiger Recognized by Goldwater Program

Brett Geiger is a rising senior in BME and conducts research with Dr. John Lannutti, associate professor, materials science and engineering, faculty, Oral Biology Graduate Studies Program; and Dr. Michael Tweedle, professor, Department
Spotlight on Students  cont’d

Brett Geiger

of Radiology, Stefanie Spielman Chair in Cancer Imaging, with the development of electrospun nanofiber based bimodal drug release systems. Dr. Tweedle is advising Brett’s research designing a polymer bead based capture device for circulating cancer tumor cells. Brett also conducted research at the Helmholtz Zentrum Geesthacht Centre for Biomaterial Development in Berlin, Germany, as part of the DAAD RISE program. A member of the Honors Collegium, Brett plans to obtain a PhD in BME and pursue a career developing polymer biomaterials at a medical technology research institute.

Brett was recently presented with Honorable Mention by the Barry M. Goldwater Scholarship and Excellence in Education Program. The Goldwater is the most prestigious national award for undergraduate researchers in science, math, and engineering.

Congratulations, Brett!

Vasudha Shukla

Shukla Receives Pelotonia Postdoctoral Fellowship

Vasudha Shukla, postdoctoral research scientist in BME, was recently awarded a Pelotonia Postdoctoral Fellowship, a two-year award that will allow Dr. Shukla to investigate novel hypotheses related to the role biomechanical forces play in lung cancer progression. For this fellowship, Dr. Shukla will be co-advised by Dr. Ghadiali, associate professor and director of graduate studies in the Department of Biomedical Engineering and the Department of Internal Medicine, Division of Pulmonary, Allergy, Critical Care and Sleep at Ohio State’s Wexner Medical Center; and Dr. Nana-Sinkam, associate professor in the Department of Internal Medicine and co-director of research programs, Division of Pulmonary, Allergy, Critical Care and Sleep at the Wexner Medical Center.

Pelotonia is a grassroots bike tour that raises money for innovative and life-saving cancer research at The Ohio State University Comprehensive Cancer Center–James Cancer Hospital and Solove Research Institute. The competitive fellowship sponsored by Pelotonia is a cancer research program developed to train the most promising cancer scientists at Ohio State. This fellowship program funds training for undergraduate, graduate, and medical students and postdoctoral fellows at the university.

Congratulations to Dr. Shukla for receiving this competitive fellowship!

Eric Moyer

Recent BME Graduate Eric Moyer Honored with University Leadership Awards

Eric Moyer graduated in spring 2013 with a BS in biomedical engineering and recently received three leadership awards from the university through the Ohio Union.

Eric’s awards include:
1) Kaplan Humanitarian Award for leading international outreach work with Solar Education and Outreach. This group is one of the College of Engineering Project Teams, supported by BME for the last two years. The group has helped provide solar powered electricity to impoverished communities in Croix-des-Bouquets and Cabaret, Haiti.

2) Scarlet, Gray, and Green Award for inspiring members of the university community to be more sustainable through programming and involvement with Solar Education and Outreach.

3) Outstanding Senior Award, recognizing seniors who “have made significant contributions to the university and community. To receive this recognition, students must have demonstrated exemplary scholarship, leadership, and service over the course of their college careers. More than a grade point average, scholarship includes contributing to the academic life of the university. Leadership may be found in a concentrated effort to make a difference to one facet of the university or in effective performance of responsibilities in more than one organization. Service involves the unselfish giving of time and effort to better the community. This award is given to less than 1 percent of Ohio State’s graduating seniors.”

Congratulations, Eric!
2013 Engineering Capstone Design Showcase

On April 23, the 6th Annual Engineering Capstone Design Showcase was held in the Blackwell Ballroom, at the Blackwell Hotel. The showcase is a culmination of senior undergraduate capstone design projects from all engineering disciplines. Individual students or student teams presented their projects and selected findings to a team of judges comprised of industry and faculty.

The Senior Capstone Design course in biomedical engineering is the culminating experience for students, and the two-semester design course provides all project teams with a real-world opportunity to solve an open-ended problem as identified by individuals with disabilities, or by community groups whose mission is to help those with disabilities. The overall goal of this program is to build a dynamic senior design program that fosters multidisciplinary efforts at the student, mentor, and university levels, and promotes outreach to the disabled community.

Sixty-six BME seniors on 19 teams collaborating with students from multiple engineering and clinical departments took part in the 2013 EEIC Engineering Capstone Design Showcase. The showcase consisted of 10 divisions: Computer Science Engineering I, II, and III; Biomedical/Mechanical Engineering; Chemical and Biomolecular Engineering; Civil and Environmental Engineering; Motorsports Capstone Projects; Multidisciplinary Engineering; Integrated and Systems Engineering (6-Sigma); and Integrated and Systems Engineering.

Winners in the Biomedical Engineering/Mechanical Engineering division were:

**1st PLACE: Hip Continuous Passive Motion (CPM)**

Students: Nicholas Black, BME; Michael Vignos, BME; Andrew Turner, ME; Elizabeth Schelgel, ME; Megan Ita, BME

Faculty advisors: David Lee, assistant professor, BME; John DeWitt, assistant clinical professor, School of Physical Therapy

Goal of project: Design a device that will provide effective therapy to patients after hip surgery by providing continuous passive motion of the hip joint to minimize scar tissue formation.

**2nd PLACE: Wheelchair Transfer**

Students: Jared Collier, ME; Justin Mesick, ME; Rachael Meyer, ME; Cameron Ramsey, ME; Eric Ricciardi, ME

Faculty advisors: Mark Ruegsegger, assistant professor and director of undergraduate studies, BME; Theresa Berner, clinical instructor, School of Health and Rehabilitation Sciences, Division of Occupational Therapy

Goal of project: Design a device that will transfer a manual wheelchair in and out of a standard-sized truck with minimal effort by the user.

The Department of Biomedical Engineering would like to commend these teams as well as the other teams who participated for a job well done! We also would like to extend our thanks and appreciation to Mark Ruegsegger, assistant professor and director of undergraduate studies, BME; David Lee, assistant professor, BME; and Ben Jones, instructional laboratory supervisor, BME.
Where are you from and what year/degree program are you in at Ohio State?

I’m from Butler, Pennsylvania, a small town just north of Pittsburgh. I’m beginning my fifth year as a PhD student in biomedical engineering here at Ohio State.

Where did you complete your undergraduate studies and what degree did you receive?

I received my bachelor’s degree in physics from Allegheny College, a liberal arts school in northwestern Pennsylvania.

What brought you to Ohio State?

I knew I really wanted to pursue biomedical research, and so I was looking for a big school with a good BME program and a strong medical center for graduate school. It also happened that my current research advisor had a project that was perfect for my research background and interests. Luckily, the stars aligned and I found myself at Ohio State!

Who is your research advisor, and can you explain your research (in layman’s terms)?

I work with Dr. Gunjan Agarwal. My main research focus is to develop a type of microscopy technique, called magnetic force microscopy, so that we can detect and characterize the magnetic properties of a particular type of nanoparticle commonly found in biology and/or used in biological applications. We have been able to increase the sensitivity of magnetic force microscopy to detect and image single magnetic nanoparticles, including the iron-storage protein ferritin. We are also working on developing a novel technique that would for the first time allow us to use magnetic force microscopy to detect magnetic nanoparticles that are in a biology-friendly (fluid) environment. We hope this will lead to new clinical tests where magnetism, for example, can be used as a way to understand the distribution of iron in the blood.

What has been your favorite class and why?

My favorite class at Ohio State was definitely anatomy. The opportunity to dissect and examine the human body firsthand was absolutely incredible!

What area of BME interests you the most?

My favorite area of BME is nanotechnology. Nanoparticles, for example, are being designed to do everything from deliver drugs to specific areas of the body to killing cancerous tumors with localized hyperthermia treatment. I think that is really awesome! Also, many biological processes happen at the nanoscale, and yet they can be challenging to observe because of limitations in current imaging techniques. So I guess you can say I’m also very interested in biomedical imaging and finding ways to improve resolution and sensitivity so we can “see” and understand the nano stuff better.

What do you hope to accomplish with your BME degree? Future plans?

I may explore some different areas of research for a while as either a postdoc or in industry. Ultimately, I would love to end up in a teaching-focused position at a smaller university, in a first-year engineering program and/or involved in BME senior design.

What do you like to do outside of research and school?

I like to stay active and spend time with my friends. Many of us play on a softball and a broomball team together, and some of us have been exploring the different group fitness classes at the RPAC. All are the perfect stress relievers and a ton of fun!
Congratulations to Our Newest Alumni!

AUTUMN 2012
Undergraduate
Jade Reaves – Randolph, MA

Master’s
Rachel Zielinski – York, PA

Doctorates
Patricia Casal – Cleveland, OH
Dissertation: "Detection of Protein Analytes in Physiologic Environments via Planar ImmunoHFET"
Advisor: Stephen Lee

Mark Stevenson – Sherwood, OH
Dissertation: "Three-Dimensional Matrices Used to Characterize Cellular Behavior"
Advisor: Keith Gooch

Junhua Tang – Guixi, China
Dissertation: "Ultrasonic Characterization of Corneal and Scleral Biomechanics"
Advisor: Jun Liu

SPRING 2013
Undergraduates
Marcus Badgeley – Westerville, OH
Matthew Baker – Columbus, OH
Nicholas Basilius – Maumee, OH
Richard Baylis – Cincinnati, OH
Nicole Basiegrad – Cincinnati, OH
Peter Bielecki – Cortland, OH
Nick Black – Brookfield, OH
Jaime Bravo – Weston, FL
Kevin Buno – Maumee, OH
Kristyn Burks – Toledo, OH
John Clark – Holland, OH
Samantha Crance – Corning, NY
Leigh Anne Diener – Columbus, OH
Matthew Farley – Batavia, OH
Lindsay Fischer – Cincinnati, OH
Tomas Guerrero – Dublin, OH
Benjamin Hill – Union, OH
Jenna Hoersten – Chagrin Falls, OH
Michael Huhn – Cincinnati, OH
Lauren Huser – Hamilton, OH
Marija Ilievka – Elyria, OH
Kari Innenberg – South Euclid, OH
Meagan Ita – Medina, OH
Sheheryar Jamali – West Chester, OH
Benjamin Jelen – Cincinnati, OH
Karen Johnston – Hilliard, OH
Megan Jones – Perrysburg, OH
Nicholas Joodi – Dublin, OH
Stephen Kleine – Springboro, OH
Yi Jun Liew – Columbus, OH
Colton Lloyd – Pickerington, OH
Kari Logan – Broadview Heights, OH
Jennifer Malik – West Chester, OH
Rachel Mallonee – Ottonwa, IA
Stephanie Marner – Loveland, OH
Jeff McNeil – Milliken, MI
Ryan Megger – Chardon, OH
Eric Moyer – Kettering, OH
Biohoan Nguyen – Mason, OH
Panayotis Papas – Akron, OH
Hiton Patel – Perrysburg, OH
Daniel Petraca – Dublin, OH
Ankit Prasad – Sylvania, OH
Mitchell Romito – Twinsburg, OH
Jessica Russo – Sagamore Hills, OH
Robert Sibilia – Wooster, OH
Kevin Soong – Monroeville, PA
Maria Talarico – Matthews, NC
Avrey Thau – Dayton, OH
Shamath Urs – Powell, OH
Jeffrey Valenti – Broadview Heights, OH
Michael Vignos – Canton, OH
Mikhail Viznyuk – Lewis Center, OH
Samantha Wadge – Amherst, OH
Jack Wellerling – Westerville, OH
Philip Wessinger – Westerville, OH
Alan Witte – Utica, OH
Yuzhi Zeng – Vernon Hills, IL
Yu Zuo – Changsha, China

Master’s
Marcus Badgeley – Columbus, OH
Britani Blackstone – Hilliard, OH
Lisa Hahn – Raleigh, NC
Karianne Logan – Broadview Heights, OH
Angel Subisak – Tamil Nadu, India
Tyler Wiederhold – Batavia, OH

Doctorate
Leilei Zhang – Inner Mongolia, China
Dissertation: "Drug-Loaded Multifunctional Microparticles for Anti-VEGF Therapy of Exudative Age-Related Macular Degeneration"
Advisor: Ronald Xu

SUMMER 2013
Undergraduates
Spencer Dunaway – Grandview, OH
Ernest Levert – Dallas, TX
Mengyu Liu – Taiyuan, China

Master’s
MS by passing PhD Candidacy:
Natalia Higuerta-Castro – Medillin, Colombia
Advisor: Samir Ghadiali

Kyle Icke – EOS – Twinsburg, OH
Advisor: John Bolte
Kevin Nelson – Plainfield, IN
Advisor: Samir Ghadiali
Mark (Tyler) Nelson – Chesterland, OH
Advisor: John Lannutti

Non-thesis MS
Joshua Hoffman – EOS – New Albany, OH
Advisor: Alan Litsky

Doctorate
Veysi Malik – Turkey
Dissertation: “Micropatterning Neuronal Networks on Nanofiber Platforms”
Advisor: Derek Hansford
Faculty Highlights

Samir Ghadiali, associate professor and director of graduate studies, BME, was awarded a National Institute of Health (NIH) P50 grant for his research titled “Patient-Specific Modeling of Eustachian Tube Function and Middle Ear Pressure Regulation.” This five-year award is part of a Clinical Research Center Grant to the University of Pittsburgh. Ghadiali is the sole PI on the subproject awarded to Ohio State. His portion totals $1.2 million and provides support of postdoc and graduate student collaborators.

Keith Gooch, associate professor, received a three-year National Science Foundation (NSF) award in the amount of $280,000 for his study of “Complex Emergent Behaviors Arising from Simple Mechanically-Mediated Cell-Matrix Interactions.”

Derek Hansford, associate professor, BME, was a 2013 Lumley Research Award recipient at the 16th Annual College of Engineering Faculty Awards. The Lumley Research Award recognizes research contributions of engineering faculty and research scientists.

David Lee, BME, was promoted from staff to assistant professor of practice.

Stephen Lee, associate professor, BME, was a 2013 Lumley Interdisciplinary Research Award recipient at the 16th Annual College of Engineering Faculty Awards. The Lumley Interdisciplinary Research Award recognizes interdisciplinary research contributions of engineering faculty and research staff. In addition, Dr. Lee was a 2012 TechColumbus Inventor of the Year Semi-Finalist.

Heather Powell, assistant professor, BME and materials science and engineering, was a 2013 Lumley Research Award recipient at the 16th Annual College of Engineering Faculty Awards. The Lumley Research Award recognizes research contributions of engineering faculty and research scientists.

Mark Ruegsegger, clinical assistant professor and director of undergraduate studies, BME, was promoted to associate professor of practice. Dr. Ruegsegger also was presented with the Herman Weed Excellence in Teaching Award at the 2013 BME Annual Awards Picnic.

Jessica Winter, assistant professor, BME, and chemical and biomolecular engineering, was a 2013 Harrison Faculty Award recipient at the 16th Annual College of Engineering Faculty Awards. The Harrison Faculty Award recognizes innovative teaching, outstanding student mentoring, and commitment to outreach.

Winter was also a recipient of the 2012 TechColumbus Inventor of the Year Award. TechColumbus recognizes an inventor who, by a single invention or multiple innovations, has created the greatest impact on technology through his, her, or their innovation(s). Winter also received the 2012 Early Career Innovator of the Year Award through The Ohio State University Office of Research.