Greetings

from the Chair

Student Profiles

Jocelyn Todd, BSE BME 2015
Christopher Winters, BSE BME 2015

Alumna Profile

Haniya Khalid BSE BME 2013

Design Day

Almost 70 BME students, faculty, and staff attended the 2015 Design of Medical Devices Conference in Minneapolis, Minnesota April 14-15th. Students participated in conference sessions, toured the UMN Medical Device Design Center, attended the Medical Devices Industry Career Fair, visited St. Jude Medical, and networked at a BME alumni reception. Thank you to BME alum Chapman Arter for hosting us at St. Jude!

Cover:  Design Day first place winners for their project titled “A simplistic, low cost prosthetic ankle/foot designed for amputees in developing countries.”

Front row, left to right: Ashley Petersen, Angelina Boulicault, Shelby Wood
Back row, left to right: Kyle Frank, Daniel Vite, Michael Meza, Michelle Vrenios, Jessica Litchfield.

Thank you to BME alum Chapman Arter for hosting us at St. Jude!

Student Achievements

Faculty Achievements

Roster
Message from the Chair

Dear Alumni and Friends of BME,

Another academic year has drawn to a close. At the May ceremony, we graduated 67 new BSE-level biomedical engineers, six students with new MS degrees, and five new PhDs in biomedical engineering. As part of our Departmental recognition of the graduating seniors, we held an evening dinner banquet which featured Dr. Susan Wood as the keynote speaker. Dr. Wood, who holds a BME degree herself, is a leading figure in the medical imaging software industry. “It’s a great time to be a BME,” Dr. Wood exclaimed, as she described how the biomedical engineering curriculum uniquely prepares students for addressing the challenges and opportunities that face our country in the areas of healthcare and the practice of medicine.

It is a great time to be a BME – the discipline continues to grow and gain recognition in academia and in industry. These advances are reflected in the strength of our academic programs, the achievements of our students and faculty, and the successes of our graduates. In this newsletter we have included several individual profiles and lots of news and pictures highlighting student, alumni, and faculty accomplishments. I hope that you enjoy reading them.

This spring we had the pleasure of recognizing Bradford Conlan as the first recipient of the Dean’s Early Career Achievement Award in Biomedical Engineering. Brad, a 2004 graduate from our undergraduate program, began working in the field of regenerative medicine soon after receiving his BS degree. His career has progressed through a series of positions of increasing responsibility. He is currently founder and CEO of Bimini Technologies, Puregraft LLC, and Kerastem Technologies LLC, San Diego-based companies working in the area of regenerative engineering. Brad came to campus in early May and addressed the first-year BME students to tell them about his career path and offer them advice as they start their studies in biomedical engineering.

I’d greatly appreciate it if you would continue sending the Department information about your career and where you are now – we’ll try to include your news in future newsletters. Please send your news and other information to bme@engineering.uiowa.edu.

We would love to have you visit Iowa City and see how our Department has grown. Does your company hire biomedical engineers? If you can visit during the academic year, we can try to schedule you as a speaker at one of our weekly undergraduate or graduate seminars. We can also set up an information session if you would like to meet informally with our students and do some recruiting for your company. Please contact me if this is something you would be interested in. We hope to see you on campus sometime soon!

We wish you a relaxing and fun-filled summer!

Joseph M. Reinhardt
Professor and Chair
Department of Biomedical Engineering
Joe-Reinhardt@uiowa.edu
Engineering was not in the grand plan for Jocelyn Todd. Both her parents are engineers and she envisioned herself in medical school or mathematics. However, after learning about biomedical engineering her junior year and taking her first year of classes, she was hooked. It’s easy to see why as you learn more about her interests.

Along with honors studies, Jocelyn is a biomechanics researcher and is on the Cross Country and Indoor/Outdoor Track teams, so her competition schedule is year-round. She states, “I always have a lot on my plate but I wouldn’t have it any other way. Staying busy keeps me sane.” While the combined load of sports and academics can make life tough sometimes, Jocelyn reasons, “Running forces me to chill out once in a while and provides a place where I can be completely removed from my academic life.” She credits her track teammates for playing an important supporting role in her endeavors.

Todd has worked in the Orthopaedic Biomechanics Lab for the past two years and states that research and track relate well together, “As a runner, I am constantly thinking about my running mechanics to enhance performance and decrease risk of injury.” Her experience as a student-athlete has allowed her, “To develop a deep understanding of setting and achieving goals, perseverance, and time management; this has greatly influenced the high standards I set for myself and fueled my decision to take on the challenge of earning a PhD.”

Jocelyn received a 2015 NSF Graduate Research Fellowship which will allow her to continue graduate studies in musculoskeletal biomechanics and helping people to live active, healthy and normal lives. At the University of Utah, she will research under Dr. Jeff Weiss, Director of the Musculoskeletal Research Laboratory, expanding their long history of computational hip work. Her German minor will come in handy this summer as she researches biomechanics at the University of Leipzig. Todd states, “I’m very excited that I can very directly apply my entire education after graduation. Since my career plans are always evolving as I gain experience, I’m keeping an open mind for my options beyond earning my PhD.”

Her advice to students? “Be a sponge! You get four (ish) short years of college and there will be no other time in your life when it is so easy to soak up great experience and knowledge. Don’t worry about deciding on a passion— try everything you can handle that’s interesting and exciting to you and let your experiences (good and bad) dictate your future plans.”
fighting. Maybe team is a better analogy, although anyone who watched me “play” basketball at the BMES tournament will readily attest that I’m no athlete. At any rate, it’s been clear since the first day I walked into the BME department and met everyone that we’re all in this together, and I feel privileged to be a part of such an outstanding community of students and colleagues. It’s an exciting place to be.”

Chris Winters hails from Oelwein, Iowa; a small town in rural northeast Iowa where he grew up working in his parents’ autobody repair business. He knew from an early age that he enjoyed tearing things apart, but enjoyed fixing things even more. Chris participated in Project Lead the Way courses which focused his interest on mechanical engineering. Then, in a high school biology class, he discovered a fascination with living things at the same time he began looking at colleges. The opportunity to combine engineering and biology at the University of Iowa made biomedical engineering the obvious choice.

Chris imagined he would work in industry after graduating, but experiences the first year and a half of school piqued his interest in medicine. With no prior exposure to the healthcare profession, Chris wondered if the field was right for him. But he also knew that he could take pre-med courses as part of his degree program. In the fall of his sophomore year, he began work in biomedical research and the study of human disease — a move that fueled his interest in medicine. Soon after, he attended a football tailgate and a surgeon from his hometown offered him the opportunity to shadow him in the operating room. Chris spent two days in the operating room and explains, “Seeing how his use of medical knowledge to treat the problems of disease so largely impacted the lives of people in my home community, I immediately knew I wanted to finish the pre-medicine requisites and apply for medical school.”

When searching for a position in a research lab, he applied for 15 positions and considered several offers. Chris chose the Department of Internal Medicine under Dr. Isabella Grumbach. He describes his first impression of her lab as fun, yet professional and collaborative. Looking back on that decision he states, “Today it is easy to say my choice to work in the Grumbach laboratory has been one of the best decisions I’ve ever made.” He studies allergic asthma and with the support of Dr. Grumbach and other lab members, he has learned several complex experimental techniques, an enormous amount of information about lung biology, and how to write scientifically. “Though it has been difficult to understand or do everything in the lab at times; the struggles, and support from my co-workers in the laboratory, have helped me to become a much more efficient and well-rounded...”

Continued on page 6
Haniya Khalid

BSE BME 2013, University of Iowa

Haniya Khalid completed her BSE with honors in May of 2013 and while at Iowa, was often the sole student representative of the United Arab Emirates. Haniya came to the University of Iowa from Dubai and is now poised to begin an exciting career with General Electric, Dubai. Here she provides some insight into her experience.

Why BME? “I wanted an academic career in something that explored both medical science and a big picture, face-to-face approach to solving real world problems,” Haniya explains. “I knew BME was a field that walked that line very well and allowed me to enhance two very separate but equally viable skill sets.” Haniya came to Iowa because she has family in the area and states, “I fell in love with Iowa City and the University of Iowa was the perfect environment for my educational and personal development.”

What did your degree bring to your career? Practical experience. “All of the senior BME classes designed around practical implications of biomedical engineering—specifically Artificial Organs & Implant Design, Cardiovascular Solid and Fluid Mechanics have been extremely conducive to a solid understanding of the significance of biomedical equipment. Ergonomics and CREO 3D Modeling were also classes that I found had purposes that stretched way beyond the classroom.”

What now? After graduation Haniya worked on a research paper, published in Frontiers in 2014. She then interviewed with GE and joined the Dubai team in February of 2014. She will now cover the Middle East region as a Sales Specialist for the monitoring modality of GE’s Life Care Solutions and looks forward to working with a dynamic team. Haniya anticipates, “A wonderful learning experience as they are all veterans in hospital technology and management.” Haniya describes her employer, “GE Healthcare UAE is a true microcosm; a hub of commercial activity. The President and CEO of the TME (Turkey Middle East Region) is headquartered in the UAE office, so we are lucky to get a thorough understanding of the quarterly activity. I think students should approach all work with an open mind, especially if they’re traveling abroad. One can sense cultural shifts across borders for sure but upon closer examination I think the cultural differences are very shallow. A passion for work is universal, and those are the people that students should seek to work with.”

Advice for current students? “Don’t be shy to talk to professors,” she advises. “Some of the best research experience I got was by knocking on doors and asking ‘Hi, do you need someone to do research for you?’ If you are new to research academia and especially if you’re international, it can be very daunting to know how and where to start. Subsequently, precious time is lost. Talk to your professors! Mentoring is absolutely essential if you are striving towards excellence—receiving and giving.”

“I work in Psychiatry [UIHC] as a Applications Developer in medical image processing. I started a chapter of Coder-Dojo, a free coding club for kids in Iowa City. We’ve been running for 3+ years now and we just participated in our second year with the Black Girls Do Science event.”

http://coderdojoic.org

MS BME 2011

Cheers,
Dave Welch

“I am celebrating my one year anniversary as a Quality Engineer for DePuy Synthes, companies of Johnson and Johnson, located in Monument, Colorado. My focus is on quality control of inventory and distributed medical devices, as well as device repair.”

BSE BME 2010

Hope all is well,
Alexandra J. Drury
senior design day

Andrea Hallier, left. “Interactive Protocol and Interface for Collecting Up-to-Date Records for Disease Associated Genetic Variations”

Matthew Coyne, right; Cassandra Kennedy, second from right. “Anterior Cervical Compression Plate”

Alex Brown, left; Yang Wu, right. “IMIG: Ophthalmology Suture Removal”

Ryan McLaughlin, left; Matthew Eganhouse, right. “Interactive Protocol and Interface for Collecting Up-to-Date Records for Disease Associated Genetic Variations”

Holly Kleinschrodt (Chair, BME Advisory Council), left; Steven Kinney, right. “Redesign of Needle Guide for Endocavity Ultrasound Probes”

Photos by Courtney Bork

Continued from page 4

biomedical engineering student,” Chris explains. His work ethic and lab experience paid off when he was nominated for Student Employee of the Year. He was named UI Student Employee of the Year, and went on to win the State of Iowa Student Employee of the Year award.

Having just earned his BSE, Chris reflects that it was most likely the problem solving aspect that originally drew him towards medicine, but the larger influence is the opportunity to someday serve a rural community like his hometown. “Although I have really enjoyed living in Iowa City, I really miss the small town feel, and I am very much looking forward to serving a tight-knit rural Iowa community in my future as a physician,” he states.

His advice to students? “Do not be afraid to ask for help. Engineering school is a challenge for everyone, and it is impossible to get through it alone. Professors and teaching assistants are great assets for answering questions and giving a further explanation of material outside of class, but working through material with classmates is great too. Your class in engineering is a very large, diverse group of brilliant people all with their own academic strengths and weaknesses. By working with them instead of against them, you get the opportunity to learn something from them while gaining a further understanding of the material you already understand by helping them through it.”

The University of Iowa Department of Biomedical Engineering
Kasra Zarei (BSE BME 2017) received the Goldwater Scholarship. Zarei is a Grand Challenge Scholar in the Honors Program.

Megan Helms (BSE BME 2018) received an ICRU research fellowship to work in Dr. Arlene Drack’s ophthalmology lab summer 2015. The project is related to albinism.

Meeshanthini Dogan (PHD 2020) received the outstanding graduate student achievement award in biomedical engineering - second place. She has two papers accepted for publication in *Child Development and Frontiers in Psychology*.

Gohar Manzar (PHD 2015) received numerous awards including: Young Investigator Award for the American Transplant Congress, Most Outstanding Poster at the Institute for Clinical and Translational Science 2015 Research Week, 3rd place at Carver College of Medicine Health Sciences Research Week Scientific Humor Contest, Best Poster in BME at Research Open House, and a Graduate Student Senate Travel Fund Award.

Alzuebeir Elsheikh (BSE BME 2016) received the Alliant Energy/Erroll B. Davis Jr. Achievement Award. The award recognizes academic achievement in engineering or business administration, leadership in campus and community organizations, and potential for future career success.

Lauren Schulz (BSE BME 2016) is double majoring in BME and dance. She will intern summer of 2015 at the Harkness Center for Dance Injury in New York City.

Sarah Coe (BSE BME 2016) completed a medical mission trip over spring break to Arcahaie, Haiti. She reports they saw over 250 patients each day in the clinic. Coe also attended the Society of Women Engineers regional conference at Notre Dame with 12 other UI women.

Cheng Zhou (PHD 2016) received travel funds from the Graduate Student Senate and the Graduate & Professional Student Government.

Johanna Uthoff (BSE BME 2015) won the Spring Undergraduate Research Fair’s Distinguished Presenter award.

Christopher Winters (BSE BME 2015) was named both University of Iowa and State of Iowa Student Employee of the Year.

Sraavya Undurty (BSE BME 2015) was featured in Iowa Now’s Student Experience series which features students who excel both in and out of the classroom.

Jocelyn Todd (BSE BME 2015) received a 2015 NSF Graduate Research Fellowship.

Greg Ongie (PHD 2019, Mathematics) is a student in BME-affiliated Professor Mathews Jacob’s lab. He received the Best Paper Award at the 2015 International Symposium on Biomedical Imaging (ISBI). Ongie and Jacob are also associated with the Iowa Institute for Biomedical Imaging.

Tianjiao Wang (PHD 2015) received an Outstanding Teaching Assistant Award from the UI Council on Teaching.

Natalie Ross (BSE BME 2018) received an ICRU research fellowship to research free radical radiation biology in Dr. Doug Spitzer’s lab, Radiation Oncology, Holden Comprehensive Cancer Center.

Yin Yu (PHD 2015) received the 2015 International Cartilage Repair Society Scientific Presentation Prize - Magna Cum Laude, along with a scholarship. He received the OARSI Young Investigator Award. His bioactive research has been featured in Science Daily and EurekAlert. Yu also won the John Pappajohn Entrepreneurial Center Business Model Competition with team members Jaison Marks (BSE BME 2016) and Xutong Guo (BS Biology 2016). He also received the outstanding graduate student achievement award in biomedical engineering - first place.
Edward Sander, Assistant Professor, received an NSF Career Award. This is the most prestigious NSF award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.

Karim Abdel-Malek, Professor and Director of the Center for Computer Aided Design, and his team of the Virtual Soldier Research Program delivered a significant tool, used by the USMC to reduce load and improve squadron efficiency. The GruntSim(TM) product was featured in the May 4th edition of the Marine Corps Times.

James Ankrum, Assistant Professor, was a finalist and prize winner for the NIH Single Cell Analysis Program ‘Follow that Cell’ Challenge. He was also the grantee of a BD Biosciences Immunology Grant.

Donald Anderson, Associate Professor (Orthopaedics & Rehabilitation; Director, Orthopaedics Biomechanics Laboratory), and the Biomechanics Lab were selected for funding

On May 4th, 2015, at The University of Iowa, College of Public Health Annual Awards Presentation and Luncheon, Professor David Wilder was inducted as an Honorary Member of the Delta Omega Honorary Society in Public Health. Delta Omega defines an Honorary Member as follows: “Honorary membership is conferred only upon persons possessing exceptional qualifications, who have attained meritorious national or international distinction in the field of public health.” Each chapter may induct only one member per year. Prior Honorary Member inductees include former U.S. Senator Tom Harkin and President Herbert Hoover.

Dr. Wilder was introduced to ergonomics by his grandfather and inventor of the overhead door, Henry Clark, who urged him to consider the person doing a job when designing a workplace. By doing so, one can reduce and preferably avoid the incidence of work-related musculoskeletal disorders and the associated personal and national costs. Dr. Wilder emphasizes the importance of treating, not only the patient, but also the workplace/physical environment in order to prevent recurrence of the problem. “I would like to put orthopaedic surgeons and neurosurgeons out of a job by eliminating the reasons for treatment of these disorders. Just think of the misery avoided and the resources that would be saved!”

Dr. Wilder holds a secondary appointment in the Occupational and Environmental Health Department and has made many contributions to The University of Iowa, College of Public Health:

- Dr. Wilder has served as core faculty of the Ergonomics Training Program within the NIOSH-funded Heartland Center for Occupational Health and Safety since the program’s inception in 2001. His annual course, “Ergonomics of Occupational Injuries,” is among the Ergonomics Training Program’s core courses.

- Dr. Wilder regularly serves on thesis or dissertation committees for trainees of the Heartland Center’s Ergonomics Training Program.

- Dr. Wilder lectures each year in the Occupational and Environmental Health Dept course “Occupational Ergonomics I,” providing non engineers enrolled in the class with an elegant and entertaining model of spine biomechanics and its relationship with low back pain, which is historically among the most common health complaint of working people.

- Dr. Wilder was instrumental in the design and implementation of the new Biomedical Engineering / Industrial Hygiene 3+2 degree program.
Biomaterials, Mechanobiology, and Tissue Engineering

James Ankrum, Assistant Professor
*Engineered cell-based therapies for diabetes and its complications, nanotechnology, medical devices*

Edward A. Sander, Assistant Professor
*Wound healing; multiscale biomechanics of native and engineered tissue; mechanobiology of growth and remodeling processes; vascular biomechanics*

Cardiovascular Biomechanics

Seth Dillard, Lecturer
*Cardiovascular fluid mechanics; computational and experimental fluid dynamics; image-based modeling*

M.L. Raghavan, Professor and Robert and Virginia Wheeler Faculty Fellow
*Mechanics of biological soft tissues; biomechanics of aneurysms and endovascular grafts; heart valve prosthesis; embolization materials*

Sarah C. Vigmostad, Assistant Professor
*Coronary blood flow dynamics; heart valve mechanics; cardiovascular implant design and analysis; RBC dynamics for analysis of blood damage; vocal cord dynamics*

Cellular Engineering

Jose G. Assouline, Adjunct Associate Professor
*Tissue engineering; nanotechnology*

Michael A. Mackey, Associate Professor
*Live cell imaging; modeling biochemical reaction pathways in living cells*

Computational Genomics

Terry A. Braun, Associate Professor and Director, Coordinated Laboratory for Computational Genomics
*Genetics; bioinformatics and computational genetics; macular degeneration*

Thomas L. Casavant, Professor, Roy J. Carver Chair in Bioinformatics and Computational Biology, and Director, Center for Bioinformatics and Computational Biology
*Bioinformatics; computational biology; genome sequence analysis; software tools for human disease mutation identification*

Todd E. Scheetz, Associate Professor
*Regulation of gene expression and processing; disease gene identification; molecular genetics of disease; computational genomics; computational phenotyping; distributed computing and parallel processing*

Michael Schnieders, Assistant Professor
*Computational modeling of protein structure & function; simulation of missense mutations; prediction of the thermodynamics of organic biomaterials*

Human Simulation & Computational Biomechanics

Karim Abdel-Malek, Professor and Director, Center for Computer-Aided Design (CCAD)
*Human simulation: human systems integration; injury prediction; human modeling; virtual reality; personal protective equipment simulation; sports simulation*

Imaging and Biological Systems

Edwin L. Dove, Associate Professor
*Medical image processing; mathematical modeling of physiological processes*

Joseph M. Reinhardt, Professor and Department Executive Officer
*Pulmonary imaging; medical image analysis*

Musculoskeletal Biomechanics

Nicole M. Grosland, Professor
*Spinal biomechanics; total joint arthroplasty; patient/subject-specific model development; finite element meshing techniques*

Nicole Kallemeyn, Lecturer
*Orthopaedic biomechanics; finite element modeling; patient-specific modeling*

Tae-Hong Lim, Professor
*Spine biomechanics; effect of mechanical loads on the cellular activities in the intervertebral discs; discogenic low back pain; mathematical modeling of spinal muscles*

David G. Wilder, Professor
*Whole body vibration; spine biomechanics; injury prevention; ergonomics; international standards development*
Faculty Achievements, cont.

by the CDMRP for a three year project partnering with the San Antonio Military Medical Center. The project is titled “Pathomechanics of Post-Traumatic OA Development in the Military Following Articular Fracture.”

Jim Martin, Associate Professor (Orthopaedic Surgery), and his graduate student, Yin Yu, were featured in Iowa Now for their bioactive gel designed to treat knee injuries and encourage the self-healing of cartilage. This hydrogel study will be featured on the cover of the May 1 issue of Arthritis and Rheumatology.

Jessica Goetz, Assistant Professor (Orthopaedic Surgery), will lead a new project involving three Orthopaedic Research Labs. The project, “Joint Distraction Treatments of Intra-articular Fracture Induced Post-traumatic Osteoarthritis in a Large Animal Model,” is funded by a $1.59 million award from the Congressionally Directed Medical Research Programs (CDMRP).

John Engelhardt, Professor (Anatomy and Cell Biology), has received a competitive renewal for the Center for Gene Therapy of Cystic Fibrosis.

Upcoming Events

Summer Graduation: August 7, 2015
Fall Semester Begins: August 24, 2015
Fall Advisory Council: October 9, 2015
Homecoming: October 10, 2015

Spring 2015 BME Graduates

Undergraduate
Andrew Amendola
Samuel Beelow
Grant Betulius
Alexander Brown
Nicholas Burghardt
Blake Carson
Erik Cole
Mary Dain
Angela Dani
Patrick Deck
Andre DeGroot, Distinction
Matthew Eganhouse
Mariam El-Hattab
Bess Fevold, High Distinction
Jordan Flaherty
Kyle Frank
Julia Grover
Christopher Heck
Siobhan Higgins
Abigail Higgins
Emmalei Huber
Gabriel Jardim
Alexander Jessen
Kayla Jones
Keegan Kavanaugh, Distinction
Cassandra Kennedy
Mitchell Kent
Steven Kinney
Harland Klauke
Connor Kriz
Kyle Krob
Briana Krueger
Lydia Kuhn
Rimas Lapinas
Jessica Litchfield
Alvin Long
Coleman McCarthy
Ryan McLaughlin
Galey Medinger
Elizabeth Mensing
John Michael
Julia Ore
Eric Pahl
Emerson Pearce
Shane Peot
Ashley Petersen
Lucas Rebik
Cody Rouner
Daniel Sanchez-Fernandez
Matthew Schmuecker
Zachary Seikel
Kevin Simoens
Benjamin Steger
Patrick Stone
Jocelyn Todd, Highest Distinction
William Tollefson, Highest Distinction
Sraavya Undurty, High Distinction
Johanna Uthoff
Daniel Vite
Michelle Vrenios
John Wagner
Christopher Winters
Zachary Winters
Jayne Wolfe
Shelby Wood
Sanam Zarei, Highest Distinction
Changhao Zhou, Distinction

Graduate
Mohammad Bataineh, PHD
Marc Brouillette, PHD
Eric Frick, MS
Kee Woong Jang, PHD
Jing Jia, MS
Alexandra Judisch, MS
Sunny Kothari, MS
Jooyeon Park, MS
Kaustubh Patwardhan, MS
Kevin Townsend, MS
Tianjiao Wang, PHD
Yin Yu, PHD

The University of Iowa Department of Biomedical Engineering
Your gifts make a difference:

Your donations help the next generation of biomedical engineers meet the challenges ahead. Please consider a gift to BME so that we can offer more student aid, improve laboratories, and strengthen our program. Please visit our website to see how you can help! www.uifoundation.org/engineering/