



Dual Threat Engineer

Aerospace Engineering Major and Starting Freshman Quarterback Joshua Dobbs Makes an Impact Both on and off the Field

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also in this issue . . .

Dr. Sudarsanam Suresh Babu Named Governor's Chair; New Student Prototyping Lab Developed Through Bright Estate; Banquet Honors Dr. William R. Hamel; COE Celebrates 175-Year History

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Welcome to the New MABE Alumni Magazine!

It is my great pleasure and honor to introduce myself as the new Department Head of Mechanical, Aerospace and Biomedical Engineering (MABE). Thanks for taking a look at our Fall/Winter Alumni Magazine. I hope you like the new design and enjoy the articles. In case you have not noticed, there is a lot going on in the MABE department and Big Orange these days.



This year we are celebrating the 175th anniversary of the College of Engineering and we are on a mission to become a Top-25 ranked public institution, with the College of Engineering leading the way. It is no understatement to say that we are in the midst of transformative change.

It is truly an exciting time to be a part of our department family, as new people are joining us, facilities are being upgraded, and activities are happening everywhere you look. In the past two years alone, MABE has added thirteen new tenure-track faculty (nine in Knoxville and four at the University of Tennessee Space Institute in Tullahoma). In this academic year, the College of Engineering has plans to add twenty-two more new faculty positions, with at least seven of them expected in MABE.

The recent growth has included MABE's first Governor's Chair, Dr. Suresh Babu, who is a world leader in Advanced Manufacturing and is teamed up with Oak Ridge National Lab's Manufacturing Demonstration Facility. Our department is now home to seven winners of the prestigious National Science Foundation Early Career Development (CAREER) award and has increased research expenditures by nearly 400% per faculty since 2005.

The Institute of Biomedical Engineering (iBME) was established in Spring 2013 and provides a focal point for BME activities at the University and the University of Tennessee Medical Center at a time of explosive growth in the field. Students are also leading the way, as the incoming freshman class has again exceeded historical records in ACT and high school GPA averages.

As a Department Head, my ultimate goal is for MABE to be the cornerstone of excellence for the College and University. To accomplish that goal, we have to build on the foundation brick-by-brick, as football coach Butch Jones would say. The good news is we already have a very solid foundation of great people in the MABE family of students, faculty, staff, friends and alumni. I am so excited to represent this great department and the MABE family.

Thanks again for taking the time to find out what's going on in MABE. I look forward to hearing from you and invite you to get in touch with us and let us know what is going on in your neck of the woods.

Go Vols!

Matthew Mench



MABE Honors Students and Faculty at Annual Honors Awards Banquet

MABE hosted its annual “Honors Awards Banquet” on April 9, 2013. While guests enjoyed a delicious dinner provided by The Foundry, individuals from MABE’s student organizations gave updates and information about events that happened in their organizations’ from the past year.

These organizations included Alpha Eta Mu Beta, Pi Tau Sigma, ASME, BMES, and SAE. During the banquet, many awards were presented to faculty, staff and students. Dr. J.A.M. Boulet won the “Outstanding Teacher Award.”

Award recipients from MABE Awards Banquet 2013:

Juniors

- Matthew James Hinricher, Mechanical Engineering, Outstanding Rising Senior
- Steven Matthew Bohling, Mechanical Engineering, Outstanding Rising Senior
- Xin Huang, Mechanical Engineering, Outstanding Rising Senior
- Matthew Scott Summers, Mechanical Engineering Outstanding Rising Senior

- Bhavin Mahesh Mistry, Aerospace Engineering, Outstanding Rising Senior
- Preston Hewgley, Biomedical Engineering, Outstanding Rising Senior

Seniors

- Jordan Richard Kreitzman, Exceptional Academic Achievement in AE
- Scott Michael Strickler, Exceptional Academic Achievement in BME
- Erika Michelle Finley, Exceptional Academic Achievement in ME

Outstanding MABE Grad Students

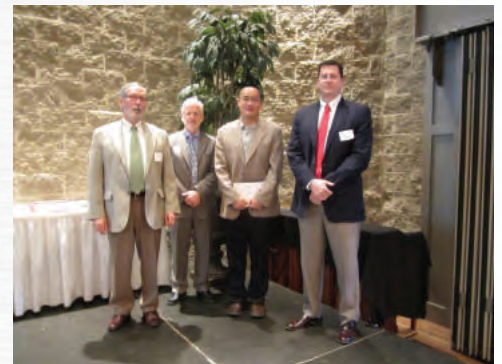
- Yujian Huang, Biomedical Engineering
- Huang Huang, Aerospace Engineering
- Joseph C. McBride, Biomedical Engineering
- Yue Wu, Mechanical Engineering

Professors

- Dr. J.A.M. Boulet, Outstanding Teacher Award: Pi Tau Sigma
- Dr. Andy Sarles, Tenure Track Outstanding Graduate Faculty Award



MABE professors (L to R), Xiaopeng Zhao, Mingjun Zhang, Zhili Zhang, Jindong Tan, and Hans DeSmidt.



Dr. William R. Hamel and Dr. Toby Boulet recognize Dr. Mingjun Zhang and Dr. Matthew Mench, recipients of the College of Engineering Research Fellow Award.

COE Award Banquet Recipients 2013

Aside from MABE’s honors awards banquet, the UT College of Engineering hosted its own awards banquet. Two MABE faculty members received College of Engineering Research Fellow Awards:

- Dr. Matthew Mench
- Dr. Mingjun Zhang

—Jenna McVey



MABE students enjoy dinner at the Honors Award Banquet.



The Foundry on the World’s Fair site provided a wonderful venue.

MABE Welcomes Caleb Rucker and Eric Wade to the Faculty

Caleb Rucker Plans Robotics Research Program That Builds on Diverse MABE Strengths

For Dr. Caleb Rucker, a new assistant professor in the MABE department, becoming an engineer was an easy decision due to inspiration that stemmed from his father, who is also an engineer. At a young age, Rucker absorbed his father's problem-solving mindset and physical curiosity about the world by building various projects with him. Along with this inspiration, Rucker said he had great high school math and science teachers, who also influenced his decision to become an engineer.



Caleb Rucker

Excited to start his career this fall at the University of Tennessee (UT), Rucker stated, "I chose UT because I wanted the opportunity to start a new robotics research program that builds on and complements the existing expertise and diverse strengths within the MABE department." Rucker added, "Expert Colleagues and potential collaborations are literally around every corner, and so many people have reached out to help guide me and identify new opportunities to help me succeed."

Rucker is interested in applied research at the intersection of robotics, solid materials, and medical applications. His past research focused on understanding robotic arms that have a continuously flexible structure, sending the mechanical interaction between robots and soft tissue, and modeling soft tissue deformation to improve image guidance in surgery. Rucker stated he is "currently working on a new type of robotic arm that is strong, yet lightweight and flexible so that it is inherently safe to operate with and around humans. Miniature versions of

this arm may also be able to provide more dexterous capabilities at the end of medical endoscopes."

Rucker received his B.S. in Engineering Mechanics and Mathematics from Liscomb University and Ph.D. in Mechanical Engineering from Vanderbilt University. He worked as a Postdoctoral Fellow at Vanderbilt University before coming to UT. More information about Rucker's research can be found on his website, <http://calebrucker.wordpress.com>.

—Kathy Williams

Eric Wade Will Focus on Technologies That Lead to Higher Quality of Life

Dr. Eric R. Wade, new assistant professor in MABE, recalls becoming interested in engineering while watching a PBS television program in elementary school. During this show, teams of college students



Eric Wade

constructed robots and competed against each other. At the time, he didn't realize that constructing robots related to engineering, but he knew it was something he wanted to be involved in when he grew up.

Wade began his engineering studies at Massachusetts Institute of Technology (MIT). As an undergraduate and graduate student at MIT, he was faced with scholarly rigor that he feels prepared him to be a faculty member at UT. He said, "I feel like it is necessary to always be writing, always be researching, and always be looking for new opportunities."

Wade looks forward to continuing this level of activity with his colleagues and students in MABE. "The opportunities provided to undergraduate students, the senior design projects, and the research and teaching

awards of the faculty all indicate a strong scholarly research environment," he said.

Research interests for Wade are in wearable sensing and assistive robotics. His line of research focuses on designing devices to quantitatively measure human behavior, extracting meaningful information from those measures, and designing robotic and virtual systems to positively influence outcomes.

"Because I am particularly interested in performing these activities in ambient settings, my research relies on novel, low-cost technologies such as inertial sensors, socially assistive robots, video game technologies, and smart phone apps," Wade said. Populations who may benefit from his line of research include: individuals who have acquired brain injuries, elderly adults, and people of all ages with motor-neurological deficits.

Wade's primary goal in MABE is to quickly establish an externally funded research lab where he can mentor and guide graduate students and produce energizing research outcomes.

"My lab will be an exciting environment where we can continue to push the boundaries of engineering and medical science," he said. Wade also wants to develop a senior level tech elective and graduate course, both focused on the application of engineering principles to monitoring and influencing human motor performance.

Twenty years from now, Wade foresees having a successful lab group consisting of undergraduate students, graduate students, and postdocs. He would also like to have ongoing collaborations with medical scientists and hospitals. "I would like to see the impact of my work go beyond publications and grants to actual changes in rehabilitation care and health policy, showing how engineering approaches can lead to higher quality of life for individuals suffering from chronic conditions," he said.

—Jenna McVey

Department Notes

Undergraduate and Graduate Student Advising Committees Formed

Undergraduate and Graduate Student Advisory Committees (Orange Brick Team and White Brick Team, respectively) have been formed to provide feedback on the Aerospace, Mechanical, and Biomedical programs and act as representatives of the department for external visitors.



Undergraduate Student Advisory Committee members: Back Row (above: L to R): Jerry Chen, Matt Price, Rob Booher, and Alex Hashemian. Front Row (L to R): Geena Doak, Christina Hurst, Michelle Morin, and Grace Biggs. Not pictured: Ben Webb. Not pictured: Graduate Student Advisory Committee members: Jacob LaManna, Alex Hashemian, and Graham Taylor.

DENSO Corporation Donates to the MABE Department

The Department of Mechanical, Aerospace, and Biomedical Engineering's rolling hybrid vehicle laboratory has received a boost. Denso North American Foundation has donated \$50,000 to the lab. The hybrid vehicle laboratory helps faculty prepare students for high-tech jobs in the industry with hands-on design experience. Matthew Mench, department head, said as a local employer and international leader in advanced automotive technology,

Denso's continual support of the department's programs are critical for their success.



Dennis Hopkins, vice president of DENSO Manufacturing Tennessee, Inc. (above, second from right), presents the check for \$50,000 to Matthew Mench (second from left). They are joined by MABE Research Assistant Professor David "Butch" Irick (left) and Wayne Davis, dean of the College of Engineering, (above right).

Undergraduate Advising Center Opens

To meet the needs of the undergraduate students, the MABE department recently established the Undergraduate Advising Center, which is located in Dougherty Room 443. Pam Ward and graduate student, Wesley Jones, are available to help undergraduate students with advising, schedule appointments with faculty members, complete forms, provide academic history, and answer other questions undergraduate students may have.



Pam Ward with graduate student Wesley Jones

Suresh Babu Named Governor's Chair in Advanced Manufacturing

This past summer, Sudarsanam Suresh Babu was named the University of Tennessee-Oak Ridge National Laboratory Governor's Chair in Advanced Manufacturing, making him the eleventh Governor's Chair at the University.



Suresh Babu

Babu is a professor in the MABE department and has a joint appointment in the Department of Materials Science and Engineering at UT. He also has an appointment in the Energy and Environmental Sciences Directorate and in the Advanced Manufacturing Program at ORNL. As Governor's Chair, Babu will lead efforts to integrate the advanced manufacturing research and design activities among UT, ORNL and industry.

Babu's research focuses on widening the scope of advanced manufacturing and additive manufacturing, also known as 3D printing, which is the process of adding successive layers to make a three-dimensional solid object from a digital model. Babu stated, "In ten to twenty years, we hope that we will stop worrying about how to manufacture products and instead worry about what to manufacture. The design of products will become the most important thing."

Babu holds a bachelor's degree in engineering from the PSG College of Technology, a master's degree in technology from the Indian Institute of Technology, and a Ph.D. in materials science from Cambridge University. Before joining UT, Babu was a professor in the Welding Engineering Program in the Department of Materials Science and Engineering at The Ohio State University. He also directed a National Science Foundation Industry and University Cooperative Research Center that focused on materials joining for energy applications.

—Kathy Williams

Joshua Dobbs: Dual Threat Engineer

This recent 4.0 GPA, perfect-attendance high school graduate and quarterback was a shining star—both on and off the field. Dobbs plans to continue making his future bright.

When Robert “Joshua” Dobbs throws a football across the field to his teammate, he is making adjustments based on quick calculations for distance, wind and the weight of the ball. The further away his target, the harder he has to throw the ball. These adjustments are done naturally in his head, but true engineers and scientists would say the art of throwing a football revolves around physics.

At first, it may be a surprise when Dobbs, a Chancellor’s Honors College student and freshman quarterback at The University of Tennessee, explains he is studying aerospace engineering. Engineering programs are rigorous and adding football practice, film study, travel, and games to the mix might make some go into overload,

or others to steer clear from attempting both the sport and choice of study altogether. But for Dobbs, physics and math are two of his favorite subjects. “Aerospace engineering is the perfect fit for the two subjects I enjoy most,” he said.

Dobbs has been fascinated with airplanes and flight for most of his life, and two events helped solidify his passion of aerospace. The first was a visit to the Kennedy Space Center in Florida when Dobbs was eight years old. Touring the facility, meeting astronauts, seeing the history, and riding in a flight simulator was a dream come true for him.

Then at age 13, Dobbs participated in the Tuskegee Airman ACE Camp, where he went behind the scenes at the airport, got up close to the planes, talked with the mechanics, watched the air traffic control operations, and flew with an instructor in a single engine plane. “Pairing these experiences with my passion for math and science was a perfect match for a future career,” Dobbs said.

Maybe Dobbs will be living proof that the cores of aerospace engineering and football naturally fit together. After all, before college, Dobbs excelled both on and off the field.

Dobbs attended Alpharetta High School (AHS) in Georgia where he shined as an honor student, student council member, Elite 11, “pro-style” quarterback, and college-prospect baseball player. At 6-foot-3, Dobbs was

recognized as an All-State, All-Region, and All-Area quarterback and was named “Player of the Year” for both his region and county.

During his senior year, he threw for 3,625 yards and 29 touchdowns while rushing for 419 yards and 10 touchdowns, leading the state in regular-season passing yards for two consecutive years.

In February 2013, he was awarded the prestigious Franklin D. Watkins Award, presented annually to the nation’s top African-American male athlete who exemplifies excellences in academics, leadership, community service, and athletics.

In May, he was selected as the AHS Class of 2013 Atlanta Journal Constitution Cup Recipient, the highest award for a member of the senior class. Dobbs’ intellectual abilities mirror his football talents. He was an exceptional high school scholar athlete with a 4.0 GPA and graduated with 13 years of perfect attendance.

Dobbs goal to achieve perfect attendance was an on-going competition between him and his mom, Stephanie Dobbs, who only missed a single day in the second grade out of 12 years of school due to a fever. Initially, Dobbs goal was to get past the second grade and then see how far he could get without missing a day.

Year after year passed, and before he knew it, he had more days behind him than before him. Ironically the biggest challenges for Dobbs to maintain perfect attendance occurred during his senior year, when he took several college and official visits. Dobbs traveled around the country during the school year, but made plans to leave town each Friday after his school’s 11:50 a.m. official daily attendance cutoff.



Joshua Dobbs steps in during the second half of the UT-Alabama game October 26, 2013.

Dobbs said there were many days that he had to race to the airport to make an early afternoon flight. On several occasions, he missed a few flights and had to go on standby because of traffic or parking issues.

“I can’t tell you how many times I had to tell a coach or host that I couldn’t make it to their campus or event until Friday evening or later that night,” he said.

Perhaps the closest he came to missing school was when Dobbs was selected to play for the Team USA National Football Team at the 2013 International Bowl. The bowl schedule centered around National Signing Day on February 6 and ran from a Thursday to the following Wednesday. To participate, he would have had to miss five days of school.

After a very long time weighing the opportunity, Dobbs respectfully declined the invitation because with four months left in school, he felt he was too close to his goal to lose 12 years and eight months of perfect attendance.

Before Dobbs signed to play football for UT, he had a long-standing commitment with Arizona State University. Dobbs said he initially chose Arizona State because of its AE program. But his initial decision changed when Coach Butch Jones contacted Dobbs about an open spot for him at UT.

“It was a long process in deciding which school to go to, but after evaluating each schools’ academic programs, sports and college life, I knew Tennessee was the school for me,” Dobbs said. Two other schools at the top of Dobbs’ extensive offer list, which he seriously considered, were Princeton and Stanford.

Now at UT, Dobbs’ transition into college has been seamless. Coach Jones wants his players to be mentally tough, and Dobbs believes this mentality will carry over into his studies as an aerospace engineer. “Football requires a lot of time and commitment, but so does aerospace engineering. The key is to have great time management skills,” he said.



Joshua, shown here with his parents, Robert and Stephanie Dobbs, was honored with the Watkins Award, which acknowledges academic excellence among African-American young men.

A typical day for Dobbs starts at about 6:30 a.m. He is in class from 8 or 9 a.m. until 2 p.m. He has football workouts one morning each week, and then afternoon meetings, practice, and film study from 2:30 to 7 p.m. After dinner, Dobbs completes the day at the Thornton Academic Center from 7:30 to about 10 p.m. and returns to his room to finish homework and prepares to start the routine over for the next day.

While attending college, Dobbs has two goals. On the field, he wants to be the best quarterback and teammate so the team can win national championships. Off the field, his goal is to be the best engineer he can and design his own airplanes one day.

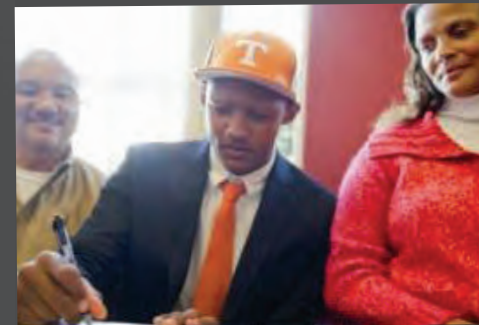
While his athlete role models Condredge Holloway, Peyton Manning, Russell Wilson, and Aaron Rodgers shape his performance on the field, his character has been shaped off the field by a few, significant people in his life.

“My life is driven by my personal relationship with Jesus Christ; and my parents, Robert and Stephanie Dobbs, who are a perfect balance of success, integrity, self-determination, and the pursuit of excellence,” Dobbs said.

The future is bright for the multi-talented freshman, both on the gridiron and in the classroom.

—Jenna McVey

Dobbs’ Path to Tennessee



TOP: Dobbs graduated from high school with a 4.0 GPA and 13 years of perfect attendance.

MIDDLE: Did you know? Before Dobbs signed to play football at UT, he had a long-standing commitment with Arizona State University.

BOTTOM: Dobbs has two goals. On the field, he wants to be the best quarterback and teammate so the team can win championships. Off the field, his goal is to be the best engineer he can be so he can design his own airplane one day.

The Rinehart S. Bright Estate Funds New Student Prototyping Lab

Rinehart S. Bright worked his way through UT shoveling coal. After getting his ME degree, he went to work for Chrysler, eventually rising to VP of the corporation. Now his estate is giving back.



The Haas CNC Lathe, one of several new machines that now equip the Prototyping Lab, was delivered to the Dougherty building on February 27, 2013.

This Fall, MABE opened The Rinehart S. Bright Laboratory, also known as the MABE Advanced Prototyping Laboratory (PL). The PL is an exciting new addition to MABE that will allow faculty and students to design and fabricate components with high degrees of complexity and accuracy not possible before. The PL was initially funded through a generous gift from the Rinehart Sensing Bright estate.

Rinehart Bright (1912-2006) received his Bachelor of Science degree in mechanical engineering from UT in 1936. To pay for his education, he worked shoveling coal into dormitory furnaces as well as other side jobs. After graduation, Bright, who was interested in cars, landed a job at Chrysler Corporation where he eventually designed and manufactured automobiles in New Orleans, Indiana and Detroit.

Bright worked at the corporation for more than 25 years and retired in 1977 as Vice President of Chrysler. He gave back to the university in many ways such as serving on UT's Development Council and including UT in his estate plans. In 1974, Bright was awarded the Nathan W. Dougherty Award, the College of Engineering's most prestigious honor.

The vision for the PL is to provide access to modern, high quality computer numerically controlled (CNC) manufacturing processes that deliver state-of-the-art fabrication experiences and capabilities. A key emphasis of the new facility is paperless processing, where Computer Aided Designs (CAD) are electronically sent to data servers in the PL and will be prepared for fabrication on one of the systems provided. Students and faculty can download the CAD part drawings, and three support computers

have the capability to correct drawings and prepare the files that will direct the CNC machines.

The PL is currently used by graduate students and faculty working on their research projects, as well as seniors for their capstone design projects. The initial suite of manufacturing systems is:

- A Haas CNC 4-axis milling machine with a working volume of 50" x 20" x 25." This machine will be used to machine larger components.
- A Haas CNC 5-axis milling machine with a high-speed spindle and working volume of 12" x 10" x 12." This milling machine will be used to fabricate smaller and more complex parts with very high accuracy.
- A Haas CNC Lathe that can turn cylindrical parts within a 16" x 29" volume.
- A modernized Bridgeport knee milling machine with a CNC controller. This machine can now be used to produce parts directly from CAD drawings.
- A Helmel coordinate measuring machine with 3D laser scanner. This machine can be used to verify part dimensions and to reverse engineer existing components.
- An OMAX CNC water jet cutting machine. The OMAX can be used to cut complex parts from sheet stock with thicknesses up to six inches. The machine can cut metals, glasses, plastics, etc.
- A Stratasys 400mc 3D printer. This machine can print precision 3D parts from a variety of polymer materials and has a working volume of 16" x 14" x 16."

Depending on funding, future possibilities for the PL include the addition of a 3D metal printer and a CNC electron discharge machining system.

—Jenna McVey

iBME Holds Reception to Give Researchers Across Disciplines Opportunity to Network



Dr. Mohamed Mahfouz, iBME Director (left), and Dr. Eric Boder, iBME Academic Director (center.)

On September 30, the Institute of Biomedical Engineering (iBME) held a reception at BridgeView for all participating faculty and program administrators (department heads, deans, etc.) so these individuals would become better acquainted with one another. iBME consists of faculty from beyond just the College of Engineering, including the College of Arts and Sciences, UT College of Veterinary Medicine, and UT Graduate School of Medicine. Many of these individuals had never met, and were not familiar with the research being conducted by each faculty member.

Dr. Christopher P. Stephens, iBME research and outreach director, said the institute currently has several facets in place to bring together complimentary researchers in the process of developing the institute and its associate research focus areas (Biomaterials and Regenerative Medicine; Computational Biology and Drug Design; Medical Sensors and Devices; Multi-Scale Imaging; Biomechanics; Healthcare Engineering and Bioinformatics; and Environmental Health). However, the reception was the first, all-inclusive iBME faculty and program administrators gathering.

“This reception allowed for large-scale, cross-disciplinary discussions between clinicians, engineers, and scientists; thereby planting multiple seeds of

collaboration,” Dr. Stephens said. These discussions have raised awareness for the diversity of expertise assembled in iBME and have opened the doors of communication, he added.

“The iBME research program coordinators and other leadership staff will continue to nurture these seedling collaborations to facilitate the development of preliminary results and multi-investigator proposals,” Dr. Stephens said.

Established in February 2013, the institute was designed to research solutions to medical problems such as devices for improved delivery of medications and monitoring of patients; better imaging technology; regenerative models to help the body heal itself; and optimized efficiency in the healthcare setting.

Ultimately the goal of iBME is to offer a multidisciplinary curriculum and real-world medical experiences to engineering students by promoting collaboration throughout the university for those participating in biomedical research.

Other leaders of the institute include Dr. Mohamed Mahfouz, director of iBME, and Dr. Eric T. Boder, iBME academic director. For more information about iBME, visit <http://ibme.utk.edu>.

Reinbolt Receives Two Awards

Dr. Jeffrey A. Reinbolt, assistant professor in biomedical engineering, was presented with a 2013 Chancellor’s Excellence in Teaching Award. This award was given to four UT faculty members exhibiting outstanding teaching techniques.

Winning this award means a lot to him because his peers, administrators, and others recognize the value of time spent instructing students. He said, “The Chancellor’s Excellence awards are a truly refreshing mechanism to recognize this type of work.”

In connection with being honored for teaching, Dr. Reinbolt also received a Faculty Early Career Development (CAREER) Award from the National Science Foundation’s (NSF) General and Age Related Disabilities Engineering program for his proposal titled: “CAREER: Research and Education on Control of Human Movement.” This program supports research leading to the development of new technologies, devices, or software for persons with disabilities.

“This award is a major milestone in my academic career and I anticipate it will lead to others in the future,” Dr. Reinbolt said. For more information on Dr. Reinbolt’s research, please visit rrg.utk.edu.

—Jenna McVey



Jeffrey Reinbolt

Endowment Established for MABE Business Manager Position



In July, longtime professor and former head of MABE Bill Hamel and new head of the MABE department

Matthew Mench joined efforts to demonstrate their commitment to the MABE program by establishing an endowment that will benefit the department's business management functions into perpetuity.

"Bill and I believe strongly in the continuing mission of this department. The business manager is one of the most important positions in the department and I believe we already have the best. This endowment will help us make sure we can compete for and reward the best person out there into the future," said Mench. Dr. Hamel could not agree more, "That's not just sentiment; Matthew and I have invested our careers in enhancing the education of our future engineers."

Hopefully this will encourage others to give back to a program that continues to bless us every day." For information on how you can give to the MABE Department Head's Endowment or establish your own legacy, email the Engineering Development Office at engrdev@utk.edu or call 865-974-2779.

—Kathy Williams

Banquet Honors Dr. William R. Hamel and Welcomes Students Back

MABE faculty, staff and graduate students gathered on August 23 to celebrate the beginning of the new school year and the end of Dr. William R. Hamel's service as department head. The "Welcome Back Graduate Students & Celebration of Dr. Hamel's Service as Department Head Reception" was held at the East Skybox Common Area on the 7th floor in the UT Neyland Stadium. The first part of the reception allowed guests to get acquainted and enjoy beverages and hors d'oeuvres.

Dr. Matthew Mench, MABE department head, kicked off the reception by thanking the graduate students for their hard work—as they make up a large part of whether or not the department is successful. Dr. Mench noted that a majority of the positive changes from the past couple of years were due to Dr. Hamel's service and determination during his time as department head.

Some of the positive changes include:

- 13 new tenure-track faculty in the past 2 years (9 at Knoxville location and 4 at UT Space Institute location in Tullahoma).
- Governor's Chair in Advanced Manufacturing, Dr. Babu, hired in July 2013.
- Faculty research expenditures have increased by an amazing 383% since 2005 (now \$300,000 per tenure track faculty per year).

Dr. Andy Sarles, MABE assistant professor, Dr. J.A.M. Boulet, MABE associate professor and associate head, and Dr. Gary V. Smith, MABE professor and associate head, also spoke about Dr. Hamel's time as department head. The three faculty members gave their highest praises for Dr. Hamel and told stories that had many of the guests in the room laughing, including Dr. Hamel himself.

"I was roasted well, but also received many encouraging and reinforcing comments about my role and the accomplishments we had enjoyed over the years. The reception was one of the nicest things that has

ever happened to me with regard to my professional world. I cannot express in words how much this meant to me, given how much of my physical and emotional capacities were focused on the department. It was gratifying to say the least," Dr. Hamel said.

Dr. Hamel is now looking forward to doing the things he enjoys most—teaching, working with students, and taking on challenging research activities. "I will definitely miss many of the people interactions associated with being the department head. But, I am very blessed to be where I am at this stage of life," Dr. Hamel said. MABE thanks Dr. Hamel for all of his wonderful years of service!

—Jenna McVey



TOP: Dr. Hamel with wife Libby and Matthew Mench.

BOTTOM: Dr. and Mrs. Hamel opening gifts from the department.

Reflecting on the Past and Future of Engineering at UT

The year 2013 marks 175 years of engineering at the University of Tennessee. The College of Engineering marked this milestone with a yearlong celebration that highlighted its graduates, students, and faculty members. The highpoint of the celebration was on October 4, 2013, which included the dedication of the John D. Tickle Engineering Building, engineering department open houses, and a grand gala event.

The MABE department showcased its productivity, research, and labs by student-led department tours that were given after the dedication of the John D. Tickle Engineering Building. These tours were held for alumni and friends of the department and highlighted the growth of the department in 175 years.

Dr. Matthew M. Mench, MABE department head, said, "It was a great opportunity to tie



Dean of the COE Wayne T. Davis (right, at podium) expresses his appreciation for the establishment of the Wayne T. Davis Endowed Dean's Chair in Engineering to the dean's chair donors (left to right) Eric Zeanah, Joe Cook, and John Tickle.

the strength of our heritage to our vision for the future. I got to meet many alumni, which was a great honor and the highlight of the weekend for me. In particular I was able to meet the grandson of Nathan W. Dougherty, the main MABE building's namesake."

He also pondered the future of the classroom experience: "So much of the college experience is about the relationships and experience of being on a campus like ours that cannot be replaced online," Dr. Mench said.

Dr. Mench noted that to be able to celebrate another 175 years of engineering, the department, college, and university must continue to deliver on promises to improve the quality of the education and students at every level.

"We need to be investing in the initiatives, facilities, and people that will propel us into the future in a better position than we are today," he said. "Lots of other Universities want to be in the Top-25 like we do. To get there, we not only have to be bigger, but also smarter and quicker about how we do things than the others out there."
—Jenna McVey

MABE's Unique History in the COE

The MABE department had its roots planted in the founding of Blount College in 1794. In 1840, the college name was changed to East Tennessee University, and in 1847 a course in mechanical philosophy and mechanics appeared in the course offerings. In 1877 the first comprehensive mechanical engineering curriculum was offered, and in 1879, the institution's name was changed to one that is still around today: the University of Tennessee.

The late 1800s and early 1900s were productive years for the mechanical engineering program. The American Society for Mechanical Engineers was founded, mechanical engineering received its first department head, Theodore F. Burgdorf, and the first degree in mechanical engineering was awarded.

The department was housed in Estabrook Hall until 1963, when it moved into the Dougherty Engineering Building, where it resides today. In 1958, the department established an off-campus graduate program in mechanical engineering at the USAF Arnold Engineering Development Center in Tullahoma, Tennessee, which evolved into the current day University of Tennessee Space Institute (UTSI).

The department continued as a mechanical engineering department until 1960, when an aerospace option to the mechanical engineering degree was offered. In 1964, the department's name was changed to Mechanical and Aerospace Engineering, and Ph.D. programs in both mechanical and aerospace engineering were established.

In 1968, the first B.S. degree was awarded in aerospace engineering. Then in 1996, the Department of Mechanical and Aerospace Engineering merged with the Department of Engineering Science and Mechanics. A popular option in the engineering science was biomedical engineering and because

of this, in 2004, the B.S., M.S., and Ph.D. biomedical engineering degree programs were established.

The first B.S. degree was awarded in biomedical engineering in 2008, and the department's name was changed to the Department of Mechanical, Aerospace, and Biomedical Engineering. Today, the MABE faculty, students, and degree programs at the Knoxville and UTSI campuses function as a single academic unit.

—Jenna McVey, with historical information gathered by Professor Emeritus Mancil Milligan and Dr. William R. Hamel



Estabrook Hall, circa early 1900s.

Dr. Ekici Named New Graduate Director



Dr. Kivanc Ekici, winner of a 2012 NSF CAREER Award for his innovative design of wind turbines, was recently named Graduate Programs Director in MABE. This position is an opportunity Dr. Ekici looks forward to. “Being given the chance to serve as the director means a lot, as I really enjoy working with graduate students and helping them with their research. The mentorship that I received during my graduate studies and as a post-doctoral research associate plays a big role in how I will continue to grow the program,” Dr. Ekici said.

Before becoming Department Head, Dr. Matthew M. Mench held the position of Graduate Programs Director for two years. “He implemented a great system, and I am lucky that the groundwork has already been laid,” said Ekici.

As the new director, Ekici wants to continue to energize the system by increasing a sense of community and collegiality among graduate students who are members of different research groups and labs in the department.

For full article visit <http://mabe.utk.edu>

— Jenna McVey

Biomedical Grad Student Caroline Bryson Receives Chancellor’s Fellowship Award

This fall, Caroline Bryson received the University of Tennessee’s Chancellor Fellowship Award and started her graduate studies in the MABE department. Bryson holds bachelor degrees in nursing and engineering from the University of Alabama in Huntsville and is pursuing her graduate degree in biomedical engineering.

When she’s not busy conducting research, Bryson volunteers in the healthcare field and works as a practitioner.

Bryson is interested in biomedical engineering because it will provide her the opportunity to understand the body as well as develop technologies that support the healing process. While working with new MABE faculty member, Dr. Caleb Rucker, Bryson hopes to “gain experience in healthcare from the patient perspective, the caregiver perspective, and a technology vantage point as well.”

Bryson said, “We’re here to make the world a better place for the people we care about, not simply to create new and interesting tools.” She intends to use her time at UT to put her words into action by focusing on her research interest of improving patient outcomes. Specifically, she is exploring ways to improve surgical outcomes using advanced robotic technologies.

“I think my clinical perspective is what differentiates me from other researchers in this arena. Other bio-tech researchers



Caroline Bryson

might say they want to improve surgical techniques or technologies, but the nurse in me wants to improve patient outcomes by leveraging new technological advances,” Bryson stated.

Bryson is excited to be at UT and grateful to be the recipient of the Chancellor’s Award. “Receiving the Chancellor’s Award and a fellowship to work with the engineering department at UT has been a life-altering experience. The award has had the effect of raising my aspirations even higher. I’m very motivated by making progress, like to get things done, and I am focused on creating valued results. Everyone I have met at UT has a sense of action about them. Forward motion is in the air at UT and the leaders here made me believe that this was a place where I could do work that will be personally and professionally rewarding. I feel humbly blessed and yet enormously inspired to be at UT,” Bryson said.

— Kathy Williams



Grace Biggs

Undergrad Grace Biggs Grateful for Co-op Opportunity

Undergraduate lab experiences can pave the way to future opportunities and are a great way for undergraduates to distinguish themselves. Grace Biggs (AE-Sp '14) started work as a sophomore in the Electrochemical Energy Storage Conversion Laboratory on a project involving performance and mass transport. She was then hired by Nuvera Fuel Cells for a yearlong co-op, where she worked on a project for the

Department of Energy to design, build, and test a fuel cell that ran at a high power density. “Co-oping for Nuvera for a year was one of the best choices I’ve made for my engineering career. I had the opportunity to experience what it’s like to be an engineer,” stated Biggs.

For more information on co-ops, email coop@utk.edu or call 865-974-5323.

Alumni Spotlight: Scott Hilleary's Gift Helps Fund Robotic Research in Automation

Hilleary's flame-resistant fabrics provide protection in a wide variety of applications, including military apparel, firefighter protective gear, race car driver helmets, and children's sleepwear.



Scott Hilleary

After graduating from the University of Tennessee MABE department in 1985 with a degree in mechanical engineering, Scott Hilleary began working

at SSM Industries, Inc., a specialized textile manufacturing company established by his father, W. C. Hilleary, who is also a UT graduate.

Hilleary started in product development and eventually cycled through management positions in each area of the company. He stated, "In that time, I have developed products and processes including some machine customization, production and quality controls, and been granted two patents registered internationally."

SSM Industries, Inc., located in Spring City, Tennessee, was established in 1982 with the vision to produce difficult-to-manufacture knitted fabrics required in apparel items used by the U.S. military for life and limb protection. Hilleary explained that their products are used in a wide range of protective apparel applications including flyers gloves, survival vests, cold water flight suits, chemical defense flight suits, armor crew and combat gloves, white military dress uniform gloves, flight helmet liners, protective (both flame resistant and ballistic) underwear, fire fighters hoods and gloves, turnout gear, electrical and petrochemical work apparel, and automotive racing apparel.

The specialized fabrics manufactured at SSM are sold to clothing manufacturers that supply clothing to the U.S. military, fire services, electrical utility and gas/oil workers, and automotive racing drivers and crews.

The success of the company and the demand for the items can be attributed to the unique features of the fabrics they produce. Hilleary stated, "Our products are engineered to include various functional properties from fire retardant chemistry applied to flammable materials like cotton, to anti-microbial finishes that kill odor-causing microbes, to moisture management finishes to make fabrics move moisture away from the skin and dry faster. We also create unique customized fabric constructions placing different fibers with special properties of strength or fire resistance or high visibility or moisture movement in the parts of the fabric where they can be most effective and efficiently used."

In the future, SSM plans to grow and continue manufacturing items that meet the needs of their buyers. "As the economies of the world continue to develop and industrialize, the demand for life and limb protective clothing will likewise develop. It is SSM's intention to contribute to the expansion of the use of these products and to continue to develop new levels of protection for all professionals for whom risk of life and limb is a daily part of the job," Hilleary stated.

Hilleary was recently approached with the opportunity to support research at UT and jumped at the opportunity to give

back to the MABE department. He made a generous \$50,000 donation to support robotic research in the area of automation technology.

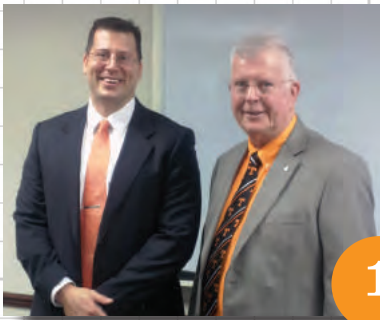
"As most will recognize, the textile industry has low-cost labor competition around the globe. Automation technology is the reason the U.S. worker productivity is among the highest in the world, which is clearly important to our industry and others. This seemed like an especially appropriate venue to give back to the University and the next generation of engineers," said Hilleary.

MABE department head Matthew Mench stated, "This gift will help the department further develop and focus a core strength of robotics and control. We have a solid core of faculty in this area, and they are doing some great things in many different areas, including medical instrumentation, high value textile manufacturing, and human-robot interaction for physical therapy, among other areas."

—Kathy Williams



SSM Industries, Inc., manufactures fabric used in aluminized turnout gear.



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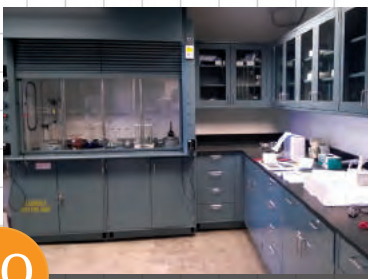


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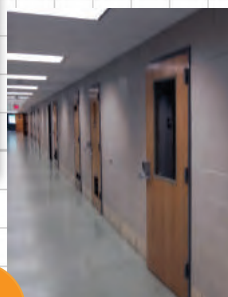
Photo Gallery



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- (1) MABE Head Matthew Mench and Sam Dougherty (grandson of Nathan W. Dougherty) meet at the MABE Open House.
- (2) Tim Newport and Brian Crawford from DENSO Corporation meet with MABE Head Matthew Mench and ASME President Yasser Ashraf Gandomi.
- (3) Matthew Mench and Pete Hoffman, Vice President of Intellectual Property Management for Boeing Company.
- (4) MABE Graduate Students, Fall 2013, with Dr. Carolyn Hodges, Vice-Provost and Dean of the Graduate School (6th from left, back row).
- (5) Grad Students show off the Eco Car during the MABE Open House.
- (6) Students attending the Engineering Fundamentals "Perspectives" Fair for Freshmen.
- (7) Grad students Andy Burch, Jake LaManna, Jake Houser, Alan Pezeshki, Jason Clement, and Yasser Ashraf Gandomi; Administrative Assistant Kathy Williams; and Department Head Matthew Mench, who planted flowers in front of the Dougherty Engineering Building.
- (8) Grad Students plant flowers in front of the Dougherty Engineering Building.
- (9) Matthew Mench visits the UT Space Institute Flight Test Facility in Tullahoma.
- (10) National Science Foundation funded upgrades to an energy-related research laboratory in the Dougherty Engineering Building.
- (11) Renovations being made to the Dougherty Engineering Building.

MABE Student Parmanand Prasad Earns Master's Degree at Age 78



Have you ever contemplated how you would spend your time after you retire? Resting? Traveling? Spending time with family? How about going back to school? After enjoying twelve years of retirement, Parmanand Prasad did just that—he decided to attend graduate school. Prasad entered the graduate program at the University of Tennessee in 2009, and this past spring he received his master's degree in mechanical engineering, a month after his 78th birthday.

Engineering is nothing new to Prasad; he spent most of his life working as an engineer in some capacity. When he retired, Prasad missed working on projects and conducting research, so he went back to work and took an engineering job at Think Tank, Inc. in Knoxville. In this position, Prasad spent his time designing a probe that would allow individuals to look into the fusion zone inside of a Tokomak. He soon realized engineering research had increased and changed since he retired, which inspired him to return to school. "I wanted to acquire up-to-date information in engineering. There has been advanced research done in every field over the years," stated Prasad.

Born in India, Prasad received his bachelor's degree in mechanical engineering from Agra University in 1957. He worked for several years constructing the Foundry Forge Plant, which is the largest foundry and forging complex in India and one of the largest of its kind in the world. In 1970, Prasad, along with his family, moved to the United States and in 1975 he became a U.S. citizen.

For a short period of time, Prasad worked at the Sperry Space Support Division and United Technologies, and in 1977, he was

hired as an engineer at the Y-12 National Security Complex, where he worked until his retirement in 1997.

While attending graduate school, Prasad worked with MABE faculty member Dr. David "Butch" Irick.

"Parmanand and I were colleagues for many years at one of the DOE facilities in Oak Ridge before his retirement and my joining the MABE faculty. I was more than happy to be his advisor when he started taking classes several years later. He is a true example of a life-long learner," Irick stated. At Y-12, Prasad worked with Dr. Irick designing components of the U.S. Navy Seawolf-class attack submarine, for which they won an engineering achievement award. Prasad also received an engineering achievement award from NASA and was granted a patent for designing a Borbole camera, which provides a cheaper alternative to core drilling.

Prasad's four children and seven grandchildren are very proud of his accomplishment. He is a role model for them; proving that they can accomplish anything they set their mind to do. Two of his sons are graduates of the UT College of Engineering. His son Ajoy Prasad received his bachelor's in electrical engineering in 1985, and son Mohan Prasad received his bachelor's degree in mechanical engineering in 1991.

Prasad wants to encourage everyone to keep learning and is proof that age has no limits. "Behave like a duck in a river, unruffled from above, but peddling like a devil underneath," Prasad said. He has taken those words to heart and believes it is a concept that will help others accomplish the unimaginable. His advice to others is, "Do your daily work with full concentration and pay attention to details and remember that work done well makes the next easier to be done."

Since graduating, Prasad is embracing retirement by reading, gardening, and traveling to national parks. He can still be seen around campus attending audited courses and visiting Hodges Library for independent study.

—Kathy Williams

Senior Citizens Eligible for Discount Rate

People age 65 or older may enroll in courses for credit at a reduced rate of \$7.00 per semester hour. Those 60 or older may audit courses at UT without paying fees.

To enroll or audit, you must first apply to the university and pay an application fee of \$60 (Graduate) or \$40 (Undergraduate).

Readmission is required if the student has not attended the University of Tennessee in the last 12 months. A registration fee of seven dollars (\$7.00) per semester hour credit up to a maximum of seventy dollars (\$70.00) for any one semester is also required.

Textbooks and other class materials must be purchased by the student. The student is responsible for other special fees (e.g., lab fees, parking, programs and services fee, technology fee, late fees, graduation fees, etc) as needed.

For additional information, contact the Office of the University Registrar at 865-974-4471 or <http://registrar.tennessee.edu>.

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Check out the MABE website: <http://mabe.utk.edu>



E01-1370-002-14



The MABE department now has a Facebook page and a LinkedIn group. These social networks are a great way to get connected with the department, alumni, fellow students, faculty, and friends of the department. So get connected with us! Search University of Tennessee Mechanical, Aerospace and Biomedical Engineering.