



Dr. TerMaath Wins  
Office of Naval  
Research Young  
Investigator  
Award



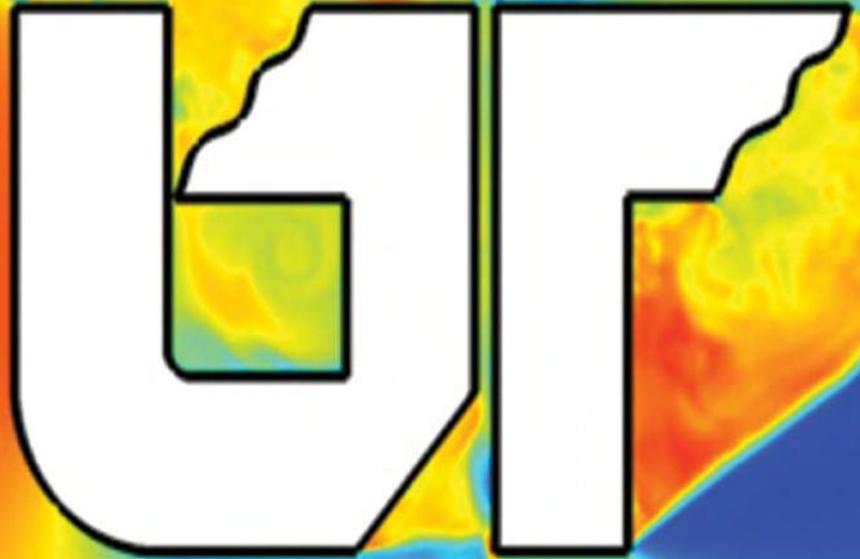
UTSI Celebrates  
Golden  
Anniversary



UT Alumnus  
Serves as  
Commander of  
ISS Mission

## AEROSPACE ENGINEERING GOES HYPERSONIC

New H.H. Arnold Chair  
Dr. John Schmisser leads the way



# Contents

Department Head's Welcome.....	1
COVER STORY: Aerospace Engineering Goes Hypersonic.....	2
Hamel is Recipient of 2014 ANS Ray Goertz Award.....	3
Mench Named to "World's Most Influential" List.....	3
Ekici and Zhang Receive Tenure and Promotion.....	4
TerMaath Receives Office of Naval Research Award.....	4
MABE Welcomes New Faculty.....	5
Kihm's Graphene Research Earns Cover of Langmuir.....	6
Sarles' Research Could Lead to Breakthroughs in Detection, Clean Water.....	7
MABE Well-Represented at 2014 ICRA.....	8
BMES Design Team Receives Honorable Mention at BMEidea.....	8
UTSI Celebrates its Golden Anniversary.....	9
Department Notes.....	11
Student News.....	12
MABE Athletes.....	12
Q&A with Joshua Dobbs.....	13
NSBE Chapter Wins National Acclaim.....	15
MABE Student Wins First Place at Business Competition.....	15
UT Team Advances in EcoCAR3 Competition.....	16
MABE Holds Annual Honors Awards Banquet.....	17
Alumni Spotlight: Dick Rosenberg, Honorary Member of ASME.....	19
UT Alumnus to Serve as Commander at International Space Station.....	20
In Memoriam: Former Astronaut, UTSI Graduate Henry Hartsfield Dies.....	20
Photo Gallery.....	21
Alumni Photos.....	22

## From the Department Head



It's a great time to be a Tennessee volunteer engineer! The College of Engineering (COE) Program is making great strides towards its goal to be a Top 25 ranked public school. In the most recent US News and World Report Ranking, the COE undergraduate program improved five spots to thirty-second public. The mechanical engineering program is now ranked thirty-sixth public, and we are working to improve on the aerospace and biomedical engineering rankings every day.

I am excited to see our department grow with the addition of twenty new faculty in the past three years. This growth includes H.H. Arnold Chair of Excellence in

Computational Fluid Mechanics, Dr. John Schmisser, former program manager of the Air Force Office of Sponsored Research (AFOSR) Aerothermodynamics and Turbulence Portfolio and AIAA Fellow. Schmisser will work at UTSI in Tullahoma and build a research center in hypersonics which bridges the Arnold Engineering Development Center, the Air Force Research Laboratory activities, and the University of Tennessee.

To improve the ranking of our BME program, we have put significant resources into establishing a larger presence in the national Biomedical Engineering Society (BMES) annual meeting this Fall in San Antonio and have opened a senior-level search for a nationally known person to become the new director of the Institute of Biomedical Engineering.

Other recent hires include Dr. Stephanie TerMaath, Dr. Matthew Young, Dr. Seungha Shin, and Dr. Libby Barker. Each of these new faculty members brings unique talents to the department. I encourage you to read about their research and plans for their future at MABE in the New Faculty feature in this magazine.

A lot of changes are happening in the department that will be beneficial to our students. One is the grand opening of a new MABE senior design suite of classrooms. The design suite is housed in Perkins and will open this Fall. This facility unifies departmental senior design activities in AE, BME, and ME. Students will have access to facilities for video conference calls and presentations with industrial sponsors, tools, and floor space for design, test, and evaluation of their projects. Advanced prototyping including 3D printing, 5 axis CNC, and water jet machining are all available.

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 and stay connected.

Go Vols!

Matthew Mench

@MABEDeptHead



Give to  
MABE  
[volsconnect.com/mabe](http://volsconnect.com/mabe)

## ON THE COVER >>



Dr. John Schmisser

# Aerospace Engineering Goes Hypersonic

## New H.H. Arnold Chair Dr. John Schmisser Leads the Way

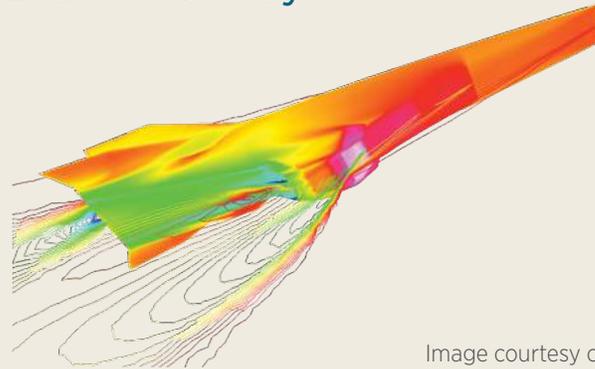


Image courtesy of Kei Lau, Boeing

What's faster than supersonic?

Hypersonic!

Last month, the US Air Force announced its plans to heavily invest in hypersonic aircraft. The first test of a hypersonic aircraft could come within five years and the technology could be applied to cruise missiles by the 2020s.

Hypersonic relates to speeds of more than five times the speed of sound (Mach 5).

The increased interest and demand in hypersonic aircraft has created a momentous opportunity for The University of Tennessee Space Institute (UTSI) in Tullahoma. They are planning to go hypersonic—meaning they will be researching hypersonic capabilities.

The effort is being led by Dr. John Schmisser, who joined UTSI as professor and H.H. Arnold Chair August 1, 2014. Schmisser has designed a multi-phase research plan that allows UTSI to engage in current opportunities while building toward new long-term capabilities. The plans initially focus on high-quality research into the fundamental phenomena of high speed flows.

The plans include both Schmisser's research into the numerical modeling of complex flows and strong shock waves and also working with the entire UTSI team to expand experimental capabilities to higher Mach numbers.

"Understanding hypersonic flow phenomena requires contributions from fluid dynamics, thermophysics and chemistry. Hypersonic technology development requires a broad spectrum of contributions from other areas including material development, thermal management, heat transfer and advanced diagnostics," Schmisser said.

UTSI, particularly MABE, has outstanding capabilities in all of these areas.

"We hope to build upon our foundational capabilities to be a source of technology innovation within the Department of Defense Test Enterprise—helping transition scientific discoveries to practical application within the test environment," Schmisser said.

In the long term, Schmisser wants UTSI to be in a position to strongly support the Air Force's goals of developing an integrated test and evaluation environment where large experimental data sets are integrated with simulations within a digital environment.

UTSI will be working closely with the Arnold Engineering Development Complex (AEDC) and the Air Force Research Laboratory (AFRL). AEDC has a long tradition of excellence in aerothermodynamics research and the AFRL plans to add a new hypersonic research group at AEDC.

"I hope working with my counterparts at AEDC and AFRL will create a culture of

hypersonic research and innovation within the region that strongly impacts national technology development programs," Schmisser said.

Prior to joining UTSI faculty, Schmisser was the Chief of the Energy, Power & Propulsion Sciences Division and Program Manager for Aerothermodynamics within the Air Force Office of Scientific Research.

Schmisser has spent his entire career researching hypersonic aerothermodynamics and spent the last thirteen years managing the Air Force basic science investments in the area.

"One of the advantages of moving to UTSI from my former Air Force position is the existing relationships I have with other universities participating in hypersonic research," Schmisser said. "We have the opportunity to build UTSI into a national focal point for hypersonics and collaborating with prominent US universities and international research partners will be an important element of our strategy."

"The excitement and optimism for our resurgent emphasis on hypersonics research is fantastic," Schmisser said.

"UTSI and the entire region around Tullahoma is excited about the future and I feel fortunate to be part of a team defining our strategic directions in the area."

—Kathy Williams

## Hamel is Recipient of 2014 ANS Ray Goertz Award



Hamel

Congratulations to Dr. William R. Hamel, MABE professor, for receiving the Ray Goertz Award on June 16, 2014, at the American Nuclear Society (ANS) Annual Meeting in Reno, Nevada.

The Ray Goertz Award was established in 1985 to recognize outstanding contributions to the field of remote technology in hazardous environments. It honors the late Raymond C. Goertz for his lifetime contribution to the advancement of remote handling systems and for his development of the

master-slave manipulator. Starting with the planning of the first formal informational exchange meeting held in 1951, Ray Goertz was also instrumental in the founding of the Robotics and Remote Systems Division (RRSD), formerly known as Remote Systems Technology Division (RSTD).

This award is presented approximately every two years, it is an ANS level award, and it is the highest honor presented by the Robotics and Remote Systems Division.

“The Ray Goertz Award is the highest recognition one can receive from the nuclear community regarding technical contributions to robotics and remote technology,” Hamel said.

“I am deeply humbled and appreciative to receive the award. Over the years, I have admired the contributions and accomplishments of those who have previously received the award. To now be on that list is an unexpected and cherished career accomplishment for me. I am very thankful to have been considered worthy of such a distinguished honor.”

This outstanding award was given to Hamel because of his commendable contributions in the area of robotics and remote systems for nuclear environments while at the Oak Ridge National Laboratory (ORNL) and the University of Tennessee, spanning from the

1970s until now. His primary contributions include technical and visionary leadership in the creation of the first microprocessor-based servomanipulator system, the jointly developed Central Research Laboratories (CRL)/ORNL M-2 dual arm force reflecting manipulator system. All servomanipulator systems have since been influenced by that early design.

Hamel continued to advance the field of robotics and remote systems by leading the development of the advanced servomanipulator system, a remotely maintainable dual arm system with an architecture amenable to rad hardening designed to support spent fuel reprocessing. He then furthered his professional experience by co-leading, with program managers at various national laboratories, the Robotics Technology Development Program (RTDP) for the Department of Energy (DOE), which is one of the largest US robotics-related research programs ever established. The RTDP was active throughout the 1990s in generating technology solutions for cleanup of DOE sites.

Hamel was also instrumental in early experiments in telerobotics, and has consistently contributed technical papers to RRSD conferences since ANS's first topicals in the early 1980s.

— Jenna Elkins

## Mench named to “World’s Most Influential” List



Mench

Dr. Matthew M. Mench, professor and department head of MABE, was recently recognized as a highly cited researcher

and named to the “World’s Most Influential Scientific Minds: 2014” list by Thomson Reuters, the world’s leading source of intelligent information for businesses and professionals.

To compile the list, Reuters studied research and releases across the globe and measured the total number of times other researchers, professors, and students cited the material in their own findings.

Rather than just basing their result on which people had been cited the most overall, Reuters looked at what individual papers within the results had been cited the highest number of times over the past decade.

Those findings placed Mench in the top

one percent of all research scientists across the globe in the engineering category.

“It’s a great honor to be among the top one percent in my profession. It’s really a team effort, though,” Mench said.

Being named to the “World’s Most Influential” list is a lifetime recognition.

“I owe so much to the outstanding students and colleagues I have worked with over the years. Without them this would not have been possible.”

Dr. Mench’s research has been focused on multi-phase transport in Electrochemical power systems such as fuel cells and batteries.

— Kathy Williams

## Ekici and Zhang Receive Tenure and Promotion



Ekici

Z. Zhang

MABE professors Dr. Kivanc Ekici and Dr. Zhili Zhang received tenure and promotion to associate professor this summer.

Ekici is the MABE graduate program director and he teaches mechanical and aeronautical engineering courses. Additionally, he currently has eight doctoral students working in his lab.

He received his PhD in 2001 from Purdue University and served as a research associ-

ate at Duke University from 2001 to 2008. He joined MABE as an assistant professor in 2008. In 2012, he received an NSF Faculty Early Career Development award and, in 2013, he became Graduate Program Director.

Ekici said he became interested in science at an early age, enjoying subjects that required analytical thinking such as his favorite subject—math. So his main research area of Computational Fluid Dynamics (CFD) should come as no surprise.

“CFD simply aims to develop novel complex mathematical and computational techniques to simulate fluid dynamic phenomena in different systems in aerospace and mechanical engineering,” Ekici said.

“CFD can be applied to many different areas of science—even in biological sciences where fluid flow is important. These may include aircraft, gas turbine engines, rotorcraft, nuclear reactors, and wind turbines, which are some of the areas I have been actively working on.”

Zhang teaches fluid mechanics, aerodynamics, and optics and lasers courses.

He received his PhD in 2008 from Princeton University, and he joined MABE as an assistant professor in 2008.

“My current research focuses on using advanced laser diagnostics for combustion and propulsion applications, especially on the high-speed (supersonic and hypersonic) flow characterization,” Zhang said.

“We are trying to utilize state-of-the-art laser facilities to understand the fundamental physics and chemistry involved in combustion and propulsions.”

Zhang has several active research projects, including laser ignition, tracking combustion reaction pathways, and nanoenergetics combustion.

To learn more about Ekici and Zhang, visit [www.mabe.utk.edu](http://www.mabe.utk.edu).

— Amanda Andrews

## TerMaath Receives Office of Naval Research Award



TerMaath

Assistant Professor Dr. Stephanie TerMaath was selected as an Office of Naval Research Young Investigator in August for her work in repairing ship hulls. The US Navy award included a \$510,000 research grant from the

Navy’s Young Investigator Program and the opportunity to continue research as a 2014 Summer Faculty Fellow at the Naval Surface Warfare Center Carderock Division in Potomac, Maryland (NSWCCD).

According to TerMaath, the summer experience was rewarding.

“It was invaluable to work alongside Naval engineers to see firsthand how ships are designed and maintained,” TerMaath said. “As a computational engineer, it was especially beneficial to have the opportunity to work

in the lab to learn how parts are fabricated and tested. This insight will enable me to develop physically realistic models for simulation.”

Specifically, TerMaath worked with other engineers at the NSWCCD developing a framework for performing probabilistic analysis using the Navy’s high performance computing (HPC) facilities.

“Given the large number of runs and the size of the models we will analyze, running the calculations on a HPC system will allow our work to be performed in a reasonable amount of time,” TerMaath said.

TerMaath’s research focused on developing analysis methods to design reliable composite patches for the repair of Navy ships.

“Composite patches are applied to undamaged or damaged metal structure as a means to improve or restore the damage tolerance and load-carrying capacity of the component,” TerMaath said. “The Navy is successfully implementing composite patches on ships for the repair and reinforcement of hulls. However, a thorough understanding of patch structural behavior is lagging.”

TerMaath explained that computational simulation is an effective method to analyze patch performance but that enhanced tools and methodology to capture the complex behavior of repaired structure are needed.

“To develop the probabilistic, multi-scale models and methodology to predict the damage tolerance and performance of a patched system requires the coalescence of fracture mechanics, experimental testing, probabilistic analysis, advanced modeling, and high performance computing,” TerMaath said. “This Navy research program integrates all of these disciplines to address several challenging problems of interacting damage mechanisms, thus exemplifying the integration of multiple disciplines to advance reliability-based ship design.”

To learn more about the Navy’s Young Investigator Program, please visit the Office of Naval Research at [www.onr.navy.mil](http://www.onr.navy.mil).

For more information on TerMaath, visit [www.mabe.utk.edu](http://www.mabe.utk.edu).

— Amanda Andrews

# MABE Welcomes New Faculty



**Dr. Stephanie TerMaath** joins MABE from UT's Department of Civil and Environmental Engineering.

"I am very excited to be a part of such a diverse and vibrant department," TerMaath said. "The faculty and students are exceptional and I am honored to be a part of the team."

TerMaath currently has two main research projects—composite patch reliability analysis and optimization of ventricular catheter design.

"Both projects are multi-disciplinary, and my research team encompasses students and researchers from many departments," TerMaath said.

She looks forward to developing a new design for ventricular catheters in order to alleviate patient suffering because of brain shunt malfunction.

"This problem requires the integration of science from the multi-disciplinary fields of high performance computing, fluid dynamics, structural mechanics, material science, nuclear imaging, mathematics, and probabilistic analysis," TerMaath said.

She is mindful of her overall career goal as she begins her work in MABE.

"I want to establish a thriving, multi-disciplinary research team in the field of computational structural mechanics," TerMaath said. "Consistent to my belief that many of today's daunting scientific challenges will only be overcome through the integration of knowledge from diverse fields, my overall career goal is to integrate my expertise and background in structural mechanics with knowledge from other fields to unravel complex, multi-physics problems whose solutions substantially impact our quality of life."

TerMaath has previously worked as both a senior engineer for Lockheed Martin Aeronautics Company and as a phantom works, engineer/scientist specialist for The Boeing Company. She is a licensed Professional Engineer in the state of North Carolina.

In addition to teaching and her research, TerMaath is faculty adviser for the Society of Women Engineers and Tau Beta Pi.

—Amanda Andrews



**Dr. Seungha Shin** completed both his PhD in mechanical engineering and postdoctoral research last year at The University of Michigan, Ann Arbor.

He is excited to join MABE as an assistant professor.

"What I like the most here is the research environment," Shin said. "University and staff are very supportive and Oak Ridge near

the campus provides abundant collaborative opportunities. In particular, I expect that the high-performance computing resources in ORNL and our university will facilitate my computational study."

Shin is also encouraged by UT's goal to become a Top 25 public university.

"I believe that the passion and potential of faculty, students, and the university will lead to achieving this goal in the near future, and I am happy to have an opportunity to contribute to this," Shin said.

Shin's research is focused on nanoscale thermal energy transport and conversion, and he is eager to begin his work here.

"In addition to expanding the fundamental research on thermal energy transport and conversion in nonequilibrium, heterostructures, I plan to study thermophysical properties in various systems such as graphene-based materials and nanostructures through the collaboration with experimental groups at UT," Shin said.

—Amanda Andrews



**Dr. Matthew Young** graduated with his PhD in mechanical engineering from MABE this past spring and shortly after graduation joined the MABE faculty as the Eastman Assistant Professor of Practice.

Originally from Florida, Young received his BS in mechanical engineering from the University of Florida, Gainesville and his MS in mechanical engineering from UT.

Young worked as Production Engineer for Matsushita Electric Corporation in Knoxville for three years after he received his BS. To hold the Eastman funded professor position, Young was required to have industry experience to connect to undergraduate education.

Some of Young's goals at MABE are to improve the work flow and data streams of MABE's advanced prototyping lab; integrate a two-year CAD exposure into the ME core curriculum; test and evaluate technology driven teaching styles such as distance learning; foster a productive, creative environment for undergraduate design innovations; and be an innovator in the use of technology in the instruction of engineering arts and sciences.

"I believe that the best engineers are balanced and well-rounded. In my own life, I've found that sports, music, friends, family, and faith all contribute to my work as an engineer and engineering contributes to the other areas of my life," Young said.

"Life happens beyond the forty-hour week and I want to see students succeed in life."

Young is currently assisting Dr. Don Dareing with the Eastman Senior Design projects and teaching three courses.

—Kathy Williams

## Kihm's Graphene Research Earns Cover of "Langmuir"



**Dr. Elizabeth Barker** joined MABE this fall as a lecturer in BME. She is a graduate of MABE, so joining the MABE faculty felt like returning home for her.

A native of Southaven, Mississippi, Barker received her PhD in molecular therapeutics and cell signaling in the Interdisciplinary program in Biomedical Sciences from the University of Tennessee Health Science Center in Memphis this past spring.

She received both her BS in biomedical engineering and her MS in polymer engineering from UTK.

Barker's interest in engineering was sparked at a young age. Her father is a mechanic by trade so she spent numerous hours in the garage helping him fix things. She developed a love of taking things apart and putting them back together. Barker's mother is a nurse, so she got to see her mom in a compassionate role where she was always helping and taking care of people. Barker found a way to blend both passions she inherited from her parents—through biomedical engineering which allows her to build things that help people.

Barker wants to contribute something positive to the MABE department. "As a lecturer, I'm in a position to inspire students to pursue careers in BME," Barker said. "I don't think students realize how diverse the biomedical engineering field is or what career options are available to them."

Barker began teaching for the first time this fall and is developing courses in anatomy and physiology and fluid mechanics specifically for biomedical engineers. She is interested in developing novel biomaterials for local drug delivery to solid tumors. She has collaborations at Oak Ridge National Laboratory (ORNL) and the VA Medical Center at Memphis to characterize and test the systems she has invented.

—Kathy Williams



**Dr. John Schmisser** joined the University of Tennessee Space Institute (UTSI) this fall as professor and H.H. Arnold Chair.

Schmisser earned his BS and MS in aerospace engineering from the University of Texas at Austin and his PhD in aeronautics and astronautics from Purdue University.

Prior to joining UTSI, he was the chief of the Energy, Power & Propulsion Sciences

Division and program manager for aerothermodynamics within the Air Force Office of Scientific Research (AFOSR).

Schmisser's research areas focus on computational fluid dynamics focusing on high-speed viscous flows, turbulent and transitional shock interactions.

He is a Fellow of the American Institute of Aeronautics and Astronautics (2012) and the Air Force Research Laboratory (2013) and is the 2008 recipient of the Air Force Science and Engineering Award in Research Management.

Schmisser will be leading the efforts for UTSI in hypersonic flow.

—Kathy Williams



Kihm

Graphene research is currently a very popular area of study in the general field of science and engineering.

Dr. Kenneth Kihm, COE's Magnavox Professor in the Department of Mechanical, Aerospace, and Biomedical Engineering (MABE), recently collaborated with researchers in Seoul, South Korea, to further explore graphene.

Graphene is a one-atom thick layer of pure carbon that touts a myriad of impressive properties, including immense strength and effective conductivity.

"Graphene is also known as an outstanding catalyst," Kihm said. "It has the potential to enhance energy conversion and storage."

Kihm said his research could lead to a variety of graphene applications. However, he specified inkjet printing as an example.

"The motivation is printing on a graphene surface," Kihm said. "Because ink is a nano-fluid."

The idea is to have the capability to "print on a pristine surface," Kihm said.

Kihm said he believes there is great opportunity for more graphene research specifically within MABE, and he wants to bring excitement about the material to the area of mechanical engineering.

"I'd like to bring some attention to MABE societies to the potential uses of graphene—bring up some exposure to our undergraduate and graduate students," Kihm said.

According to Kihm, graphene research is an exemplary opportunity for interdisciplinary collaboration.

Langmuir is a highly-regarded peer-reviewed journal produced by the American Chemical Society. Kihm's collaborative research, "Wetting and Evaporative Aggregation of Nanofluid Droplets on CVD-Synthesized Hydrophobic Graphene Surfaces," was published in the July 22, 2014, issue.

—Amanda Andrews



Sarles

## Sarles' Research Could Lead to Breakthroughs in Detection, Clean Water

The ability to pull water out of fog is just one of many possibilities made real by research involving Dr. Andy Sarles, an assistant professor in the Department of Mechanical, Aerospace, and Biomedical Engineering.

The project Sarles took part in—Air-stable Droplet Interface Bilayers on Oil-infused Surfaces—was published recently in the Proceedings of the National Academy of Sciences.

In short, what the team, made up of Sarles and scientists from Oak Ridge National Laboratory (ORNL) Center for Nanophase Material Sciences and the ORNL Energy and Transportation Science Division, uncovered was that water droplets placed on oil-infused surfaces formed stable, interconnected volumes without fusing into increasingly larger droplets.

Creating networks of these connected droplets is key to future breakthroughs.

While the physics of droplets on an oil-coated surface shows the promise of pulling water from fog, the ability to form air-stable lipid membranes will allow researchers to do everything from detecting airborne species like chemical or biological toxins, pollutants or synthetic nanoparticles, as well as converting energy using biological molecules

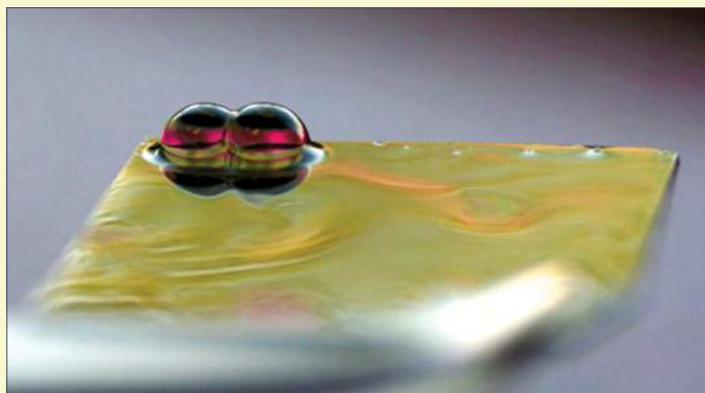
contained in the membrane.

“The first goal of this work was to understand the mechanisms that allow for droplets to remain as separate entities on the oil-coated surfaces,” said Sarles. “After that, we want to apply those principles to a variety of sensing, energy conversion and even protein study applications.”

Along with this discovery came the awareness of how to create artificial cell membranes—called lipid bilayers—between droplets in air.

Previous work had established that when water droplets submerged in oil collided the oil between the droplets would be excluded, allowing the droplets to coalesce in just seconds.

But by placing droplets on an oil-coated, superhydrophobic surface rather than submerging them, Sarles and the team showed that droplets would spontaneously join together and yet not coalesce when they collided. Instead, a thin layer of oil was wicked between the adjoined droplets, making a stable connection that lasted for up to days



Air-stable water droplet networks are valuable for applications in biological sensing and membrane research.

at a time.

“I measured the thicknesses of oil films that spontaneously assembled between colliding droplets,” said Sarles. “I pierced them with thin electrodes so that I could monitor how well electrical charge was stored at the interface between droplets, which allowed us to estimate the thickness of the oil film over time as the oil slowly drained.”

And while this thin layer of oil does eventually drain out—leading to coalescence—Sarles and the team showed that the fluid physics that caused the droplets to draw together could also be used to assemble artificial cell membranes.

This breakthrough enabled the team to extend the lifetime of the interface between droplets and marks the first time that droplet interface bilayers were formed in air.

— David Goddard

# MABE Well-Represented at 2014 ICRA Conference



From left: Conference General Chair Dr. Ning Xi of Michigan State University with MABE's Dr. Caleb Rucker, Caroline Bryson, and Conference Program Chair Dr. William R. Hamel.

This year the conference theme was “Robotics and Automation: Technologies Enabling New Economic Growth,” which reflected the growing spectrum and recent developments in robotics and automation around the world.

Dr. William R. Hamel and Dr. Jindong Tan from the MABE Department served as the program chair and co-chair respectively. Dr. Caleb Rucker and Dr. Eric Wade, MABE assistant professors, also attended the conference.

Dr. Lynne Parker, from the Department of Electrical Engineering and Computer Science, served as the editor-in-chief of the Conference Editorial Board, which provided approximately 6,000 reviews of the 2,085 papers submitted to the conference. The program committee selected 1,017 papers for presentation during the three days of the conference and publication in the proceedings. UT COE professors and students authored nine papers at this exclusive international meeting.

Among hundreds of papers in the area of robot manipulation, Rucker and his PhD student, Caroline E. Bryson, received the ICRA Best Manipulation Paper Award for their paper entitled, “Toward Parallel Continuum Manipulators.” The paper describes a new type of dexterous manipulator arm made from multiple flexible rods, which could impact both minimally invasive surgery and safe human-robot interaction. This prestigious award highlights innovative efforts in the planning and execution of manipulation tasks, which take place in dynamic environments. The award criterion also states that the paper should overcome numerous challenges, that new applications are highly sought after, and that the integration of humans is critical.

This is an outstanding achievement for Rucker and Bryson who joined MABE in 2013.

“I am very proud of all the hard work that our lab members have put in over the past year to conduct and present this research,” said Rucker. “Undergraduate students Andrew Orekhov, Scotty Chung, and Jonathan Carlton helped produce demonstration hardware and videos which enhanced Caroline’s excellent presentation at the conference. We are humbled and grateful for the award, which will further inspire our continued work.”

— Jenna Elkins

The UT College of Engineering (COE) and the MABE Department was strongly represented at the 2014 IEEE Conference on Robotics and Automation (ICRA) held in Hong Kong, China, May 31 through June 7.

ICRA is one of the world’s largest conferences on robotics and automation research, covering everything from surgical robotic tools to friendly humanoids to unmanned aerial vehicles.

# BMES Design Team Receives Honorable Mention at BMEidea

The UT BMES Design Team has reason to celebrate. The team’s ezPCR app received Honorable Mention for Global Access and Affordability at the BMEidea Competition.

The BMEidea competition recognizes the best of the best in student-driven, innovative biomedical engineering design with high commercial potential and social impact.

The team developed an affordable, marketable, and portable PCR (polymerase chain reaction) device that can be used in rural and resource-limited areas. The unit is operated wirelessly via Bluetooth using a custom ezPCR mobile-device app, which would obviate the need for computers or “wall-powered” recording equipment.

“I am impressed by the level of devotion and innovation the BMES student group demon-



Left to right: Guru Venkatesan, Graham Taylor, Cameron Pilkey, Willy Yingha, Alex Zare, Tony Nguyen, Jon Dreitlein, Carson Barnes, David Jacobs, and Trey Fisher

strated,” said Dr. Xiaopeng Zhao, associate professor in MABE and overseer of the project.

“Their vision for improving global healthcare quality should be applauded. It is exciting that

the group’s effort was recognized in the BMEidea competition.”

The UT team competed with top Ivy League schools like John Hopkins, Stanford, and MIT, so receiving honorable mention was a huge accomplishment for the team.

“It is a remarkable result from this first year effort which was completed in only three months with \$1,500,” said design team member Graham Taylor. “The output was definitely synergistic with the combination of talented undergraduates and graduate students that we had. It was truly a team effort.”

The design team consisted of eleven students including eight undergraduates led by three graduate student mentors.

—Kathy Williams

# UTSI Celebrates its Golden Anniversary



From left: UT College of Engineering Dean Dr. Wayne Davis, MABE Department Head Dr. Matthew M. Mench and UT Chancellor Jimmy Cheek

The University of Tennessee Space Institute (UTSI) marked its 50th anniversary with a two-day celebration September 11-12, 2014.

As many as 300 people gathered to celebrate this milestone of the institute.

The celebration events included a picnic, games, concerts, comedy show with well-known comedian Henry Cho, fireworks, a historical and technical session, student poster presentations, and a banquet.

Several UTSI alumni and professors participated in the historical and technical session. Notable guest speakers included: David Hiebert, retired AEDC historian; Dr. Wesley Harris, first UT/UTSI vice president; Dr. James Wu, UTSI professor emeritus; Dr. Roger Crawford, UTSI alumnus and professor emeritus; John Rampy, UTSI alumnus and retired AEDC executive director; Pete Hoffman, UTSI alumnus and Boeing Vice President; and Winfried Goethert, son of the UTSI founder.

"It was great to be a participant in the two-day celebration at UTSI," College of Engineering Dean Wayne Davis said.

"The college has played a very active role in the institute, including its inception in 1964 as well as prior to that time when engineering courses were offered at Arnold Air Force Base and at AEDC."

UTSI, located on Woods Reservoir in rural Tullahoma, was founded in 1964 to support Arnold Engineering Development Center (AEDC) at Arnold Air Force Base as an education and research facility.

The campus is adjacent to AEDC and the

Air Force Base on 365 acres made available by the US Air Force and granted to UTSI by the Department of Health, Education and Welfare.

Talks to open a space technology institute began as early as 1949.

In 1956, the Air Force made contractual arrangements with the University of Tennessee to establish an AEDC graduate study program for center employees, using office and classroom space provided by the Air Force.

Joel Bailey was the initial director of the UT effort followed by Robert Young.

When the National Aeronautics and Space Administration (NASA) was established in 1958, the need for space education was noticeable at AEDC and NASA. At that time, there were very few academic institutions offering engineering courses in space technology. Dr. B.H. Goethert seized upon this national need and proposed to both the Air Force and Tennessee state government that a space institute be built in Tullahoma near AEDC. As a result of Goethert's proposal, UTSI was established and Goethert was appointed first dean of the institute.

"Let us not make the mistake of believing that all that is necessary is to erect a minimum square building at the shore of the AEDC lake and nail a shingle 'Space Institute' over the doorstep," Goethert said at a 1963 ceremony. "It must inspire scientists and express a vision of an institute equaling or exceeding any other space center on this continent or abroad."

UTSI has lived up to those words—becom-

ing an internationally recognized institution for graduate study and research in engineering, physics, mathematics, and aviation systems and has made remarkable contributions at the local, state, national, and global levels.

In its fifty years, UTSI has had more than 2,000 graduates, including 250 doctorates and nine astronauts.

"Our graduates stand as a testament to our contributions to both aerospace and the defense of the country," UTSI Executive Director Dr. Robert "Buddy" Moore said.

"We're also focused on making scientific and technical advances, not only in issues surrounding flight but in the automotive industry as well."

"Having nine UTSI faculty members as part of MABE, along with other faculty at UTSI, brings unique strengths and partnership opportunities that enrich our graduate program," MABE Department Head Dr. Matthew M. Mench said.

The next fifty years look promising for UTSI.

With the recent plans to go hypersonic under the direction of Dr. John Schmisser, UTSI will no doubt continue to make noteworthy contributions to space technology.

"We are particularly excited about the future and the closer relationship that we have now have at UTSI," Davis said. "There are many new initiatives under way such as the hypersonics program that should really bode well for the partnership that we have with the base, the companies in the Tullahoma area and the overall community."

—Kathy Williams



UTSI alumnus and Boeing Vice President Pete Hoffman



From left: Dr. John Schmisser and UT Chancellor Jimmy Cheek



Dr. Jackie Johnson, a professor at UTSI, is dunked by UTSI Executive Director Dr. Buddy Moore.



UTSI professor Dr. Phuriwat Anusonti-Inthra's family plays carnival games



UTSI Professor Emeritus Dr. James Hu speaks during technical session



From left: UTSI Executive Director Dr. Buddy Moore and UTSI professor Dr. Ahmad Vakili



From left: Sylvia Davis, Dr. Buddy Moore, and UT College of Engineering Dean Dr. Wayne Davis



UTSI Celebration Banquet



From Left: Dr. Reza Abedi, Dr. Feng Zhang, MABE Department Head Dr. Matthew Mench, and Dr. Phuriwat Anusonti-Inthra



From left: DENSO's Brian Crawford and Scott Sheets present a check to MABE Department Head Dr. Matthew Mench. They are joined by DENSO's Sara Harris.

## DENSO Boosts UT Engineering's Hybrid Vehicle Research

Engineering students researching hybrid vehicle technology at the University of Tennessee, got a \$50,000 shot in the arm recently from the DENSO North America Foundation.

"The support DENSO has given and continues to give our college is a tremendous asset for our students," said College of Engineering Dean Wayne Davis. "They have directly impacted, in a positive way, our ability to educate students in a number of automotive-related areas."

Part of the Department of Mechanical, Aerospace, and Biomedical

Engineering, the Advanced Powertrains, Controls, and System Integration—or APC-SI—Rolling Laboratory will allow students to develop new technology in those areas much faster than ever before.

The lab is designed so that students can test their ideas in a simulated vehicle environment, a technique known as in-the-loop testing, rather than having to install them in "real" automobiles.

Avoiding the need to constantly change out the parts they are testing will save researchers time and money and can help manufacturers get the latest products to market faster as well.

That opportunity, combined with the company's past history with UT, made DENSO's support natural.

"Our longstanding partnership with UT's engineering program is important to the quality of products we produce around the world," said DENSO Manufacturing Tennessee Senior Vice President Mike Brackett.

The added bonus of the support is that it will allow UT students to focus more on hybrid vehicles and other green technology, helping them prepare for the rapidly changing automotive world.

For its part, DENSO views the grant not just as an opportunity for advancements in technology but as an investment in what it feels is UT's greatest resource: students.

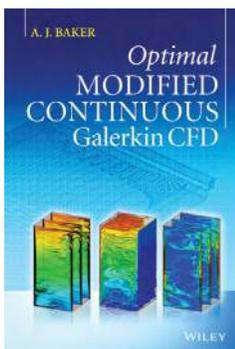
According to the company, that has a benefit to everyone involved.

"Supporting these high-caliber educational programs provides us with local student co-ops, senior design collaboration and full-time engineers," said Brackett, who is also a board member of the North America DENSO Foundation. "This alliance has ongoing value to us and the entire automotive industry."

The foundation, an offshoot of the Japanese automotive parts manufacturer of the same name, started in 2001 with the goal of helping support the ideas of students in the fields of engineering and technology.

In addition to the current grant, they have also sponsored the EcoCar program, emissions research and control programs at UT.

—David Goddard



## Baker Completes Second Book Since Retirement

MABE Professor Emeritus Dr. A.J. Baker has completed his second textbook since retiring in 2010.

Published by John Wiley, London, *Optimal Modified Continuous Galerkin CFD* (2014) organizes at the advanced graduate level some three decades of academic research progress in weak-form computational fluid dynamics (CFD) theory and practice.

It details validation of comprehensive theoretical advances stemming principally from a dozen-plus PhD dissertations completed under the MABE CFD Laboratory focus, in replacing his pioneering 1983 textbook *Finite Element Computational Fluid Mechanics*.

Baker has written a total of five textbooks during his career.



Webb

## Webb Receives Two Scholarships

Joseph “Ben” Webb, an undergraduate in the MABE department, is the recipient of the Howard Bernstein Industrial Distribution Scholarship (\$5,000) and the AACE International Scholarship (\$6,000) for the 2014-2015 academic year.

The Howard Bernstein scholarship, which is sponsored by Ningbo Ruyi Joint Stock Co, is awarded by the Material Handling Education Foundation, Inc.

Webb works as an Undergraduate Assistant in the Electrochemical Energy Storage and Conversion Laboratory under the direction of Dr. Matthew Mench, MABE professor and department head. Webb began his senior year of studies this fall.

—Kathy Williams



Hewgley

## Hewgley Named Top Summer Graduate Student

William “Preston” Hewgley graduated Summa Cum Laude this summer, thus being the top graduate in the College of Engineering. Hewgley received his Bachelor’s degree in biomedical engineering.

Hewgley pursued a degree in engineering to learn the fundamentals of biomedical technology so he can one day become a technology-aware physician.

“I continually look for areas in the medical field where I can use the engineering knowledge I gained at UT to advance the field of healthcare in my future career,” Hewgley said.

Hewgley is interested in biomedical devices as well as bioinformatics. He plans to begin medical school next year at the University of Tennessee Health Science Center in Memphis.

Other top summer graduates were Michael Earl Bailey, graduating Magna Cum Laude in biomedical engineering; Michael Anthony Harris, graduating Magna Cum Laude in biomedical engineering; and Eric Christian Bridges, graduating Cum Laude in biomedical engineering.

—Kathy Williams

## MABE Student Athletes 2014-2015



Gretchen Aucoin  
Softball  
BME



Kaitlyn Bailey  
Rowing  
BME



Kathryn Culhane  
Soccer  
ME



James Dagley  
Swimming & Diving  
ME



Elizabeth Dickson  
Rowing  
ME



Joshua Dobbs  
Football  
AE



Alexander Ellis  
Football  
BME



Andre Hillsman  
Track & Field  
ME



Todd Kelly, Jr.  
Football  
BME



Heather Kiger  
Swimming & Diving  
AE



Brittany Lindl  
Tennis  
ME



David Priddy  
Football  
ME



Rachael Whitaker  
Rowing  
ME

# Q&A with Joshua Dobbs

Dobbs is an Aerospace Engineering student and UT football quarterback. He took some time to answer some questions about his freshman year.



**How would you grade your freshman year—in the classroom and on the field?**

I feel that my freshman year was very productive, both in the classroom and on the field. Since I came to UT with several dual-enrollment and advanced-placement credits from high school, I was able to jump right into a number of core curriculum courses for my major, as well as several honors classes to meet the Chancellor's Honors Program requirements. My biggest academic challenge last year was juggling and finding time to meet with my study and project groups. Late afternoon and early evening were the preferred meeting times for the group; but, my schedule usually conflicted because of afternoon practice. Fortunately, we found creative ways to meet at the lab or Baker Center late nights and Sundays.

Athletically, I worked hard to add solid weight and strength in Coach Dave Lawson's conditioning program. I also expanded my understanding of our playbook, got priceless game experience as a true freshman against nationally ranked teams, and helped our team get its first SEC road win in years.

**In what ways have you grown/matured in the last year? What are your goals for your sophomore year?**

In the last year, I've grown mostly in my ability to pace myself. I have a better understanding of how to manage the grind of

the football season and the academic year. I took a very aggressive load of honors classes this past year, which will help me accomplish two of my academic goals for this year. First, with the exception of an Honors Senior Project, I only need two more honors classes to complete my required curriculum for the Chancellors' Honors Program. So, I plan to take the two classes by next summer. Second, I also plan to complete the entire course requirements for my business administration minor. On the athletic side, I want to add at least five more pounds of muscle, continue to master the fine details of our offense, and improve my pre-snap reads.

**Most news stories about you mention that you're an aerospace engineering major and they emphasize that because it's seen as a more difficult major. NFL.com even named you one of 14 smartest college football players in the country. Does that put even more pressure on you in the classroom? Do your teammates ever mention it?**

Obviously aerospace engineering isn't a typical major for a football player. Having such a demanding schedule, I do appreciate that others recognize the challenge; but I'm just one of many student athletes out there that push themselves in the classroom. It was an honor to be included in Bryan Fischer's "14 for '14: Smartest Players in College Football" article and it was really nice for NFL.com to recognize the academic side

of college football. It's a shame that the list wasn't longer; because, as Mr. Fischer said in the article, there are thousands of dedicated student-athletes that put in the work in the classroom.

Of course, there is some pressure being included in those types of conversations; but I wouldn't say that it puts any more pressure on me than I already put on myself.

No, my teammates don't really say anything about my major. From time to time, I am asked to help with a homework problem or two, which I don't mind. A great thing about our team is that I am just one of several players working hard in the classroom. We are all trying to take advantage of the academic opportunities. For example, not only I, but all of my current roommates, Brett Kendrick, Marquez North, and Dylan Wiesman, and a previous roommate, Malik Brown, were named to the 2013-14 SEC First-Year Academic Honor Roll.

**What role does spirituality play in your life?**

Wow, I don't know if there is enough space in this article to fully cover that subject. My personal relationship with Jesus Christ means everything to me. Everything that I am or ever hope to be, I owe to God and my parents. I try to live my life in a way that it glorifies God in everything I do. I was raised in a Christian home, where my parents grounded me in principles that help me deal with the demands of life. I believe in the power of prayer. Whether a situation is good or bad, I am guided by my faith. I am a member of First Redeemer Church back home. I try to attend church regularly here in Knoxville and really enjoy visiting several of the local churches.

**What it is like getting to know Peyton Manning? What have you learned from him that you can take with you on and off the field?**

This summer was my third opportunity to spend time with Peyton Manning. The first was several years ago when I camped at his Manning Passing Academy in Thibodaux, Louisiana, and then, of course, during his two annual visits here on campus. Picking his brain is an amazing experience. It is humbling to see his work ethic first hand. During his most recent visit, we were actually able to sit

down and watch film with him in addition to throwing live. We talked a lot of football, and he shared personal tips which I am working to implement into my play. He talked about how to study opposing defenses, what to look for when you approach the line of scrimmage, and how to mentally confuse the defense. His message to our QB group was pretty simple—if you want to be good at what you do, study and practice. The remarkable thing about Peyton is that despite all that he has accomplished—the awards, the records, and the accolades—he still works so hard on maintaining and improving his game. One of the privileges of playing football at the University of Tennessee is having an opportunity to learn from the greatest to play the QB position.

**You are also taking some business classes. Why did you choose them on top of AE classes?**

In addition to majoring in aerospace engineering, I am also getting a minor in business administration because I plan to eventually run my own company. I think it's important to prepare for those opportunities now. My dad, whose background is in finance and commercial banking, has shared some of his experiences with me. In his line of work, he often sees professionals in engineering, medicine or technology who are very capable in their specialized fields, but are challenged in running the business side of their companies or practices. He and my mom recommended that I at least get a business minor for now and consider getting an MBA down the road.

**How do you deal with some of the pressure and criticism that comes with being the QB at UT?**

Pressure and criticism isn't unique to the QB position. Anyone who has played sports knows that pressure to succeed and criticism are a part of the job when you play competitive sports at any level. It starts in pee wee sports. By the time you reach the college stage, the pressure magnifies exponentially, especially when you play for a program with as rich a football history as the University of Tennessee. We definitely have some of the most passionate and loyal fans in the country. Everybody just wants to win. In the QB position, you quickly learned that you are often going to get both credit or blame for things you shouldn't. So you simply try to stay focused and centered on the goal, never getting too high or too low. You only worry about the things that you can control. You look for support and encouragement from your teammates who go to battle with you every day, your coaches who understand the process and your family and true friends who love you no matter what you do.

**Have you enjoyed your engineering classes so far? What courses do you look forward to the most?**

Yes, I have really enjoyed my engineering classes so far. Last year my favorite classes were Honors Physics for Engineers I and II. My professor, Dr. Chris Pionke, was very thorough and personable. It was nice to have the same instructor for both semesters, which really helped to maintain continuity with the material. The hands-on labs and projects throughout the year were fun and creative. My favorite assignment was the model car project. We designed, out of simply scrap materials, a car capable of traveling twenty feet down a track to hit a target. In fact, my small group won our class competition with the fastest and most accurate car.

I am really looking forward to getting into the heart of my upcoming aerospace classes. Two courses that stand out at the 300 level are Airplane Performance (AE 370), which focuses on aircraft control, and Structural Analysis of Aerospace Vehicles (AE 363), where we finally start to examine the structure of space vehicles. Then in the 400 level classes, Astronautics (AE 424), which has a really cool name, introduces orbital mechanics and human factors in space flight; and finally in Aerospace Engineering Lab (AE 449), I'll get to conduct extensive design experiments.

**How have the other students in MABE treated you? Do you have many friends outside of football?**

My fellow MABE classmates have treated me like any other MABE student. They see that I'm no different than they are. We are all trying to survive the rigor of the coursework. And yes, I do have friends outside of football. I am friends with several people from my classes. One of the benefits of being in the Chancellor's Honors Program is the opportunity to participate in small discussion-based classes, which allows a lot of interaction with my classmates. I have made several friends while working on class projects and labs. I also spend a good bit of time studying with friends from class.

**What is your opinion on unionizing college football or paying players a stipend?**

I haven't thought much about unionizing college football, but I know that it is a pretty complex proposition, especially when you think about the possible impact it could have on the player/coach interactions. The shift of players becoming employees and coaches/universities becoming employers is a big move. I don't know if unionization, as I understand it, is the answer, but I agree that there are definitely

parts of the current NCAA amateurism system that can be improved. The top three issues that stick out to me are covering full cost of attendance, providing extended health care benefits for the serious, debilitating injuries, and giving players a seat at the discussion tables. As a member of our Players' Staff, which, thanks to Coach Butch Jones, is our team's version of a player-guided leadership council, I see the value of giving players an avenue to voice concerns and make suggestions.

—Kathy Williams



## MABE Student Wins First Place at Business Competition



Left to right: Ayron Hall, Zach Lee, Christopher Saah, and Andrea Hayes with Director of Operations for the Anderson Center Tom Graves

Six student-owned businesses won the seventh annual UT Undergraduate Business Plan Competition this spring.

They were chosen from among thirty-one business plans that competed for \$20,000 in donated prize money in a contest sponsored by the Anderson Center for Entrepreneurship and Innovation, housed in the College of Business Administration.

Christopher Saah, a senior in mechanical engineering, took first place in the lifestyle category with MYPTShop.com, an e-commerce site that helps personal trainers run their businesses and provides them with additional revenue streams.

The students competed for first, second, and third place in two different categories—growth and technology-enabled businesses, and lifestyle businesses.

First-place winners won \$5,000, second-place winners received \$3,000, and third-place winners won \$2,000.

— David Goddard

## NSBE Chapter Wins National Acclaim



Left to right: UT NSBE members Isaac Atuahene, DeAnna Walker, Diamond Wallace, Markyith Smith, Sierra Ellis, and Tiffany Sithiphone

In March, UT National Society of Black Engineers members Isaac Atuahene, DeAnna Walker, Diamond Wallace, Markyith Smith, Sierra Ellis, and Tiffany Sithiphone were honored with various awards at the NSBE convention in Nashville, including being named the national chapter of the year.

UT's chapter of the National Society of Black Engineers was recognized as the National Medium Chapter of the Year and senior Tiffany Sithiphone became the first female from UT to be elected regional chairperson, capping a highly successful national convention for members from the College of Engineering last week in Nashville.

"This is truly a tremendous recognition for our group to receive, and it highlights the successes being made here at UT toward a more diverse campus," said College of Engineering Dean Wayne Davis. "To be recognized for those efforts is nice enough, but to be singled out in front of peer institutions makes it all the more special."

Sithiphone, from Nashville, is only the second UT student overall to be elected regional chairperson, after Trevor Williams—her mentor—in 2007.

"It was just such an incredible feeling when they called my name," said Sithiphone. "As I stood there taking the oath I felt like I was having an out-of-body experience. I hope I never lose this feeling."

Sithiphone, an industrial engineering major, said that as nice as the award is for her personally, the real happiness in winning the award is what it says about the opportunity for underrepresented students at UT.

"For the national society to take notice of us, to single us out as a chapter is really special, and it makes you proud to be a Vol," said Sithiphone. "You see the opportunities that have been created here at Ten-

nessee, you see the progress we've made, and hopefully that can serve as an example to other universities and inspire them to do some of the great things we've done here at UT."

UT chapter president Diamond Wallace, from Memphis, was equally enthused about the chapter's success. In addition to winning the national award this year, UT was honored as a top regional chapter for the second consecutive year.

"We can proudly say that this year we had three national scholarship recipients, an educator of the year, and our first female region chair," said Wallace, a biomedical engineering major. "We're producing leaders, and more specifically leaders in STEM fields, and I am excited that our national society has taken notice."

Isaac Atuahene, a graduate student from Ghana in industrial and systems engineering at UT, received a Golden Torch as winner of the Dr. Janice A. Lumpkin Educator of the Year Award for contributions related to research and education, while undergraduates Sierra Ellis, from Memphis, Markyith Smith, from Nashville, and DeAnna Walker, from Chattanooga, were chosen as a Board of Corporate Affiliates Fellow Scholar, a Lockheed Martin Scholar, and a Major Fellow Scholar, respectively.

Ellis and Smith are mechanical engineering majors, while Walker is in civil engineering.

"Our chapter continues to excel and take on new challenges," said UT Engineering Diversity Programs Director Travis Griffin. "They have a keen vision to fulfill the NSBE's mission and increase the success rate of our engineering students, and I think that was on display for all to see in Nashville."

— David Goddard

# UT Team Advances in EcoCAR3 Competition



EcoCAR 3



Irick

The University of Tennessee, Knoxville, has been selected to compete in the EcoCAR 3 Advanced Vehicle Technology Competition (AVTC), continuing a tradition of extended participation in all but one competition series in the twenty-six-year history of AVTCs.

“It is a tremendous honor for us, once again, to be able to be a part of such a prestigious competition,” said College of Engineering Dean Wayne Davis. “Dr. (David) Irick and his team really put in a lot of effort, and I think that is reflected on their continual inclusion in the event.”

Sixteen universities will be competing, using a Chevrolet Camaro as their stock car.

“EcoCAR is an opportunity for the next generation of automotive engineers to help design and build innovative advanced vehicles that will reduce greenhouse gas emissions, protect the environment and save American families and businesses money at the pump,” U.S. Energy Secretary Ernest Moniz announced. “Through this competition, North American students gain valuable real-life experience that they can use to bring the auto industry into the cleaner energy future.

Advanced Vehicle Technology Competitions began in 1988 when the U.S. Department of Energy partnered with various automakers to sponsor the first AVTC. This will be the 11th overall competition in a string that began with the “Methanol Marathon” and has included topics such as vehicle design, fuel challenges and vehicle electrification, and has expanded to include communications and business teams.

Established by the Energy Department and General Motors, and managed by

Argonne National Laboratory, EcoCAR 3 is the latest AVTC aimed at developing the next generation of automotive engineers. The four-year program will conclude in the summer of 2018.

“Being selected to EcoCar3 validates our efforts in all of the AVTC competitions we’ve been in,” said Irick, a research assistant professor in the Department of Mechanical, Aerospace and Biomedical Engineering and the ongoing faculty advisor for UT’s AVTC teams. “It’s an endorsement not just for our program and the support that the college has given, but also for the collaboration we have with the College of Business Administration and the College of Communication and Information.”

“The competition used to be geared more toward alternate fuels, but it’s been focused on hybrid vehicle technology since around 1992,” said Irick.

For EcoCAR 3 the goal will be for teams to focus on reducing costs and coming up with new innovations that make hybrid or electric vehicles more accessible and more likely to be adopted by the general public. The added challenge to teams this time is to make improvements in fuel efficiency and emissions reduction while maintaining performance, safety, and consumer appeal.

“That’s the other part of the challenge,” said Irick. “The end result of your car needs to be that you can’t tell it apart from a stock model. It needs to look completely like something you could get at the dealer.”

As part of the competition, teams are composed of engineers, researchers and even their own media representatives. Typically, they contain fifteen to twenty team members, but some have as many as seventy-five.

UT’s past teams have been sponsored in part by local industries including DENSO and the Electric Power Research Institute, as well as the support that they’ve received from the university and alumni.

Support also comes in expertise, as General Motors and other auto-related businesses will be available to mentor and provide advice and feedback along the way.

“The help they give is just as important as anything financial,” said Irick. “They really do give a lot to all of the teams in terms of support and advice.”

In addition to the assistance that industry partners can lend teams along the way, students also have the added benefit of having worked with them throughout the process, leading many to employment with those companies.

“That’s the great thing: It’s not just simulated experience, it’s honest real-world experience that these team members have once they are finished,” said Irick. “At a minimum, it’s like having a year of on-the-job training when they report to work. They’re used to the software, the tools, the vehicle development process, so they can be immediately productive.”

General Motors, in particular, has been a successful landing pad for UT’s graduates.

“GM’s EcoCAR 2 team quotes the statistic that approximately fifty percent of the students that go through AVTCs and then work for them have applied for a patent on a new idea or design within two or three years at the company,” said Irick. “They’ve hired ten or so of our students from the last two AVTCs, and having that relationship is beneficial to the teams, to GM and to the students individually.”

—David Goddard

# 17 MABE Holds Annual Honors Awards Banquet

On April 10, 2014, more than 150 students, faculty, staff, board members, and friends of the department gathered at The Foundry in downtown Knoxville to honor the top MABE students, staff and faculty.

Former UT football player and motivational speaker Inky Johnson was the guest speaker at the banquet. He gave a touching and emotional testimony to those in attendance. He encouraged everyone to never give up, keep working hard, and to “empty the bucket.”

MAHLE, a leading global development partner for the automotive and engine industry, sponsored Johnson.



1. Inky Johnson speaks to guests at the awards banquet
2. Dr. Toby Boulet, Outstanding AE Junior Brandon Rogers, and Dr. Matthew M. Mench
3. Dr. Matthew M. Mench and Inky Johnson
4. Dr. Matthew M. Mench with Innovation Award winner Alex Hashemian
5. Outstanding MABE graduate students Jason Howison & Jordan Sawyer with Dr. Matthew M. Mench

## Award Recipients >>

### Juniors

- Brandon Rogers, Outstanding Aerospace Engineering Junior
- Bhavin Mahesh Mistry, Outstanding Aerospace Engineering Junior
- Michael Fister, Outstanding Biomedical Engineering Junior
- David Klumpe, Outstanding Mechanical Engineering Junior
- Patrick Bias, Outstanding Mechanical Engineering Junior

### Seniors

- Andrew Lund, Outstanding Aerospace Engineering Senior
- Williams Hewgley, Outstanding Biomedical Engineering Senior
- John Taylor, Outstanding Biomedical Engineering Senior
- Xin Huang, Outstanding Mechanical Engineering Senior
- Matthew Summers, Outstanding Mechanical Engineering Senior

### Outstanding MABE Graduate Students

- Jason Howison, Aerospace Engineering
- Jordan Sawyer, Aerospace Engineering

### Staff

- Kathy Williams, Outstanding Achievement Staff Award
- Diana Bishop, Outstanding Achievement Staff Award

### Professors

- Dr. Feng Zhang, Tenure-Track Faculty Award
- Dr. Toby Boulet, Outstanding Service Award
- Dr. Suresh Babu, Outstanding Faculty Award
- Dr. Larry Sharpe, Outstanding Teacher Award: Pi Tau Sigma

### UT College of Engineering Awards

The UT College of Engineering hosted its annual awards banquet in the spring. Two MABE faculty members received awards:

- Dr. Jackie Johnson, COE Research Fellow Award
- Dr. Butch Irick, The Charles Edward Ferris Faculty Award

UT Engineering alumni work for these matching-gift companies and many others:

**Alcoa.** AT&T. ADP. Abbott Laboratories.  
Accenture. **Agilent Technologies.** Alstom Power. Amsted Industries. Apple.  
Armstrong. Atmos Energy. BASF. BP. Ball Corporation. **B&W Y-12.**  
**Bechtel.** Boeing. Bridgestone/Firestone Americas. Brink's Co.  
Bristol-Myers Squibb. Capital Group companies. Cardinal Health. Chevron.  
Cisco Systems. Coca-Cola. **ConocoPhillips.** DCP Midstream. **Denso.**  
Dow Chemical Company. Duke Energy. Eaton Corporation. **DuPont.**  
**ExxonMobil.** FMC Technologies. Fluor. GenCorp. General Electric.  
Georgia Power. Google. Harley-Davidson. **IBM.** Integrity Applications Incorporated.  
Intel. J.P. Morgan Chase. Johnson & Johnson. Johnson Controls. Kimberly-Clark.  
Lennox International. Levi Strauss. Lincoln Financial Group. Medtronic.  
**Lockheed Martin.** Merck & Co. Inc. Microsoft. **Motorola.**  
Norfolk Southern. Northrop Grumman. PepsiCo. Piedmont Natural Gas.  
Procter & Gamble. Qualcomm Incorporated. Raytheon Company. **Rockwell Collins.**  
Schering-Plough. **Siemens Energy.** Schneider Electric/Square D.  
SAIC. Shell. Southern Company Services. Takeda Pharmaceuticals.  
Telcordia Technologies. Texas Instruments. **Verizon.** Wells Fargo.

Find out if your company has a matching gift program here: [matchinggifts.com/tennessee](http://matchinggifts.com/tennessee)

## Increase your impact!

Every gift of every size to the College of Engineering builds momentum. Many graduates work for companies that match dollars—1-to-1, 2-to-2, and even 3-to-1! Those multipliers add up fast.

# contribute

Increase your investment with a matching gift. Learn how.

Call 865-974-2779 or visit [engr.utk.edu/give](http://engr.utk.edu/give)

THE UNIVERSITY of TENNESSEE  
**UT FOUNDATION**  
KNOXVILLE

## Alumni Spotlight: Dick Rosenberg, Honorary Member of ASME



Rosenberg

In 2003, MABE alumnus Richard “Dick” Rosenberg was named Honorary Member of the American Society of Mechanical Engineers (ASME) for his contributions to the engineering profession.

ASME awards the honorary membership to persons who have made distinctive contributions to engineering, science, industry, research, public service, or other pursuits allied with and beneficial to the engineering profession. Since its inception in 1880, there have only been 350 awardees. This award ranks second only to the ASME medal in terms of stature.

Born in New York City, Rosenberg realized at age eight he wanted to become a mechanical engineer. His interest in engineering was sparked by a Gilbert Erector Set his father purchased for him.

Rosenberg had a rocky start to his engineering career. On his seventeenth birthday, he enlisted in the US Navy and served for three years. He then enrolled in college and began pursuing his dream of becoming a mechanical engineer. However, college was not easy for Rosenberg, and after three years as a student with a declining academic record, he decided to drop out of the University of Virginia.

“Although I had several years of an engineering education, I did not have a degree and job opportunities,” Rosenberg said. “I concluded that I had better do something because at the current rate the future looked pretty bleak.”

So, Rosenberg began looking for work and applied for a job at Oak Ridge National Laboratory (ORNL), but he could not start

work there until he received security clearance. While awaiting clearance, he accepted a job at DuPont, but the job was not what he’d expected. Rosenberg realized he could do better, and began working at ORNL when he received his clearance. At ORNL he worked as an assistant engineer with several other young men—all of whom had engineering degrees. Rosenberg soon realized not having a degree was holding him back in his career.

Rosenberg’s life changed completely when he met the love of his life, Esther Druker. Druker agreed to marry Rosenberg only if he promised to return to school and get his degree in engineering. That was enough motivation for Rosenberg. He resigned from his position at ORNL and applied to the University of Tennessee. Joel Bailey, mechanical engineering department head at the time, conditionally accepted Rosenberg. Rosenberg’s performance during his first quarter would determine if he could remain in the program.

“I had to be able to demonstrate that I was a better performer than what the record showed,” Rosenberg said.

Rosenberg maintained an “A” average for four quarters and graduated with a degree in mechanical engineering in 1954.

“I shall be forever indebted to Joel Bailey for giving me that chance,” Rosenberg said.

After graduation, Rosenberg returned to work at ORNL. But because he desired to use his education for civilian applications rather than weaponry, he decided to move on.

Rosenberg held various engineering positions throughout his career with Westinghouse Atomic Power Laboratory, American Standard, and General Atomic. He retired from General Atomic in 1986 as manager and second in command over the Fort Sr. Vrain High Temperature Gas Cooled Reactor Project.

Rosenberg’s involvement with ASME began early when he joined as a student member in 1946. He became an active member in 1961 and has held several ASME positions including: San Diego Section Secretary/Treasurer, Chairman of the San Diego Section, Region Secretary, and Region Vice President. He was elected ASME’s 106th President in 1987, and he held that position for one year.

“Because I recognized early on that I would have nothing if it weren’t for the fact that I was an engineer, I have always felt



Rosenberg (center) in Moscow with members of the Soviet Academy of Science

it was my obligation to give back to that profession,” Rosenberg said. “I chose to do that via participation in ASME.”

Rosenberg is a member of the Society’s Committee of Past Presidents and is still involved in the affairs of ASME.

In addition to being named an ASME Honorary Member, he has received the ASME Centennial Medallion, the ASME Dedicated Service Award, and was named the San Diego Engineer of the Year in 1988.

Rosenberg’s advice for aspiring engineers is straightforward.

“Don’t go into engineering if the primary motivation is to earn a lot of money,” Rosenberg said.

“Do go into engineering if you feel that is what you want to do as the principal activity of your waking hours for the rest of your life. Have as much respect for those under you as you do for those above. Don’t feel you have to do everything yourself. It is more important to be able to ask the right questions and then know how to find the answers, and the ability to communicate orally and in writing is as important as the mastering of technical knowledge.”

Since retiring, Rosenberg has consulted for the United States Atomic Energy Commission at the Rocky Flats, Colorado facility and led technical groups to Europe and Asia as part of the People to People program. He is now fully retired, and he and his wife have taken full advantage of the opportunity to travel—visiting all seven continents.

Rosenberg and his wife currently reside in San Diego, California. They have three daughters and four grandchildren.

—Kathy Williams

## Alumni News

### UT Alumnus Serves as Commander of International Space Station

UT alumnus and NASA astronaut Barry "Butch" Wilmore is commanding the latest crew to launch to the International Space Station.

Wilmore graduated with a master's degree in aviation systems in 1994 from the UT Space Institute. He and cosmonauts Elena Serova and Alexander Samokutyaev of the Russian Federal Space Agency (Roscosmos) launched to the space station September 25 from the Baikonur Cosmodrome in Kazakhstan.

Wilmore, Serova, and Samokutyaev will serve as flight engineers for ISS Expedition 41 until November, at which time Wilmore will assume command of Expedition 42. The trio is scheduled to return to Earth in March 2015.

A captain in the US Navy, Wilmore grew up in Mount Juliet, Tennessee. During his tenure as a fleet naval officer and pilot, Wilmore completed four operational deployments, flying the A-7E and FA-18 aircraft. He has accumulated almost 7,000 flight hours and more than 600 carrier landings.

Wilmore joined NASA in 2000 and flew aboard the space shuttle Atlantis for STS-129 in November 2009. The mission



Wilmore

delivered two EXPRESS logistics carriers and about 30,000 pounds of replacement parts to the space station.

To date, Wilmore has 10 days, 19 hours, and 16 minutes of space flight to his credit.

— David Goddard

## IN MEMORIAM

### Henry Hartsfield, Jr. NASA Astronaut

Former NASA astronaut and UT graduate Henry W. (Hank) Hartsfield, Jr. died on July 17 after an illness. He was 80 years old.

Hartsfield earned a master's degree in engineering science from the UT Space Institute in 1971. He served as commander of space shuttle Discovery's maiden mission and flew on three shuttle

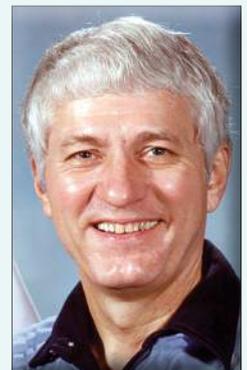
flights. After his final shuttle flight, Hartsfield served in a number of NASA administrative posts, including deputy chief of the astronaut office, deputy director for flight crew operations, and director of the Technical Integration and Analysis Division at NASA Headquarters.

Next he became deputy manager for operations in the Space Station Operations Office at NASA's Marshall Space Flight Center in Huntsville, Alabama. Back at the Johnson Space Center in Houston he worked in the Space Station Freedom Program and later as manager of the International

Space Station Independence Assessment Team.

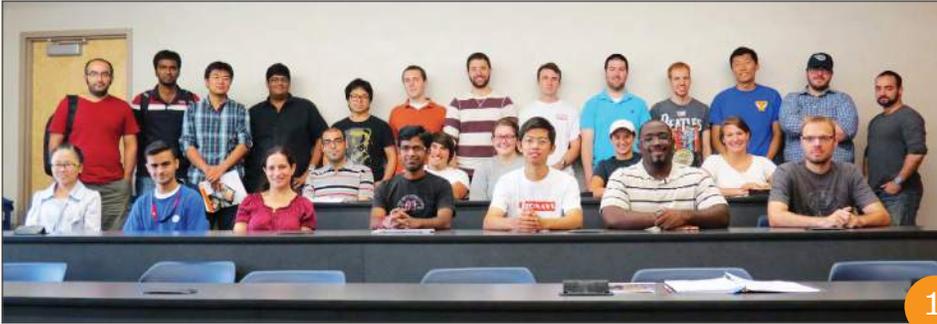
He later became NASA's director of independent assurance for Human Exploration and Development of Space.

— David Goddard



Hartsfield, Jr.

# Photo Gallery



1



2



3



4



5



6



8



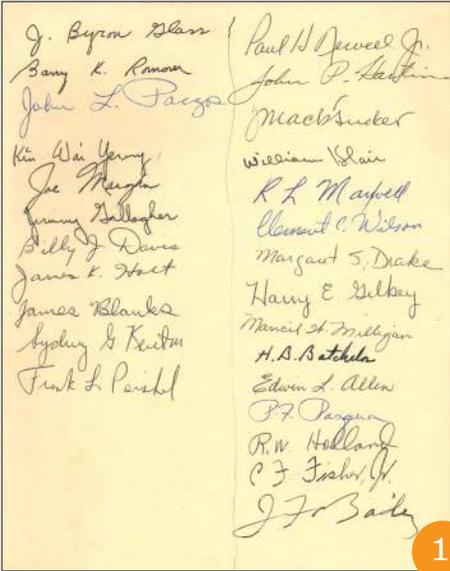
7



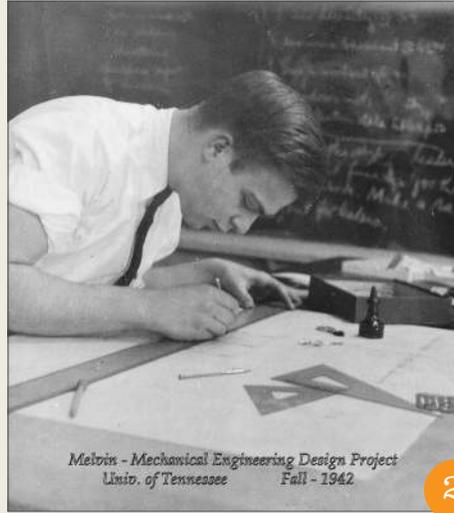
9

1. New 2014 UT MABE Graduate Students
2. Dr. Matthew Mench speaking at Fall 2014 graduate student orientation seminar
3. Mustang spotted at UT alumni event
4. Orange deer spotted on UTSI campus
5. ASME UT Chapter President Yasser Ashraf Gandomi speaks with graduate students
6. Dr. Matthew Mench with Rich (MABE alum) and Melva Bible
7. Dr. Matthew Mench and ME alum and '98 SEC Football National Champion Joshua Tucker meet at Atlanta alumni event
8. United States Secretary of Energy Dr. Ernest Moniz, Senator Lamar Alexander, Chancellor Jimmy Cheek, and UT President Joe DiPietro with members of the EcoCAR 2 team
9. MABE alum and space program veteran, Sam Dougherty, speaks to more than 100 students about the future of manned spaceflight.

# Alumni Photos



1



2

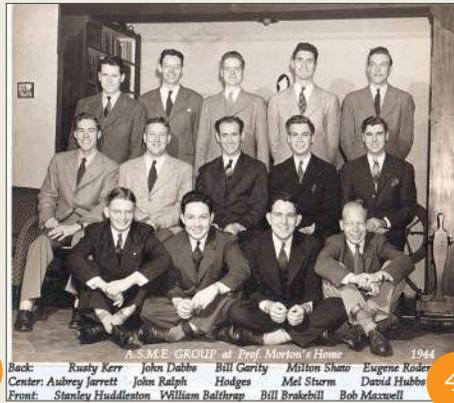
Attention Alumni! The MABE department is collecting old photos that relate to the UT mechanical, aerospace, and biomedical engineering department. If you have any photos that are dated between the early 1900s and the 1980s, we would love for you to share them with us. The photos can be of your research, labs, you and your friends in MABE, projects, etc. Please send a digital copy to [williamk@utk.edu](mailto:williamk@utk.edu). We look forward to rediscovering our past!

From the collection of Franklin T. Dodge (BS/ME'60)

1. "When I was attending UT (Class of 1960), the new initiates of the Pi Tau Sigma ME honorary society had to get all the ME faculty and the current members of Pi Tau Sigma to sign their names in the initiate's copy of his/her Steam Tables (we still had to buy a copy in those days). This image is a copy of the page in my Steam Tables (1957 version) with the signatures I collected. Down the right hand side are the signatures of the faculty and on the left hand side are the signatures of the Pi Tau Sigma members. I collected the signatures during the 1959 Fall Quarter, so most, if not all the members, were in the class of 1960. The head of the ME department then was Joel F. Bailey, whose signature is the last one on the list. About halfway down the list of faculty is Mancil Milligan's signature who was a graduate student/instructor then but was the department head later on." - Dodge

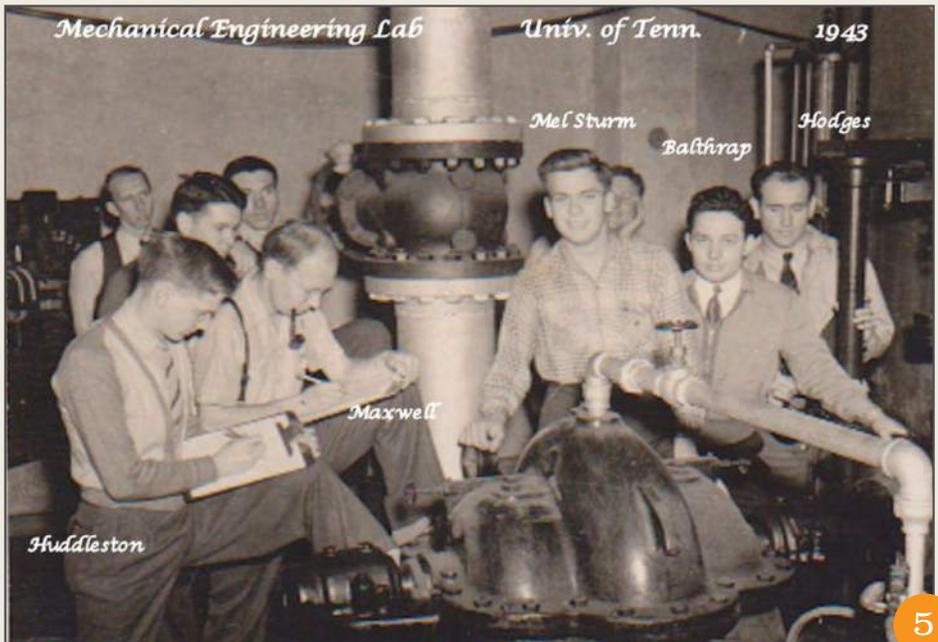


3



4

From the collection of Melvin S. Sturm (BS/ME'44)



5

- Group photos include fellow student Robert "Bob" Maxwell who later became a professor in mechanical engineering at UT.

2. Sturm works on an engineering project during his college days

3. Sturm, front row center, poses with his 1944 mechanical engineering laboratory group. Robert Maxwell is at Sturm's right

4. Sturm's 1944 ASME group poses at their professor's home. Front row from left: Stanley Huddleston, William Balthrap, Bill Brakebill, and Robert Maxwell. Second row from left: Aubrey Jarrett, John Ralph, Hodges (no first name given), Sturm, and David Hubbs. Back row from left: Rusty Kerr, John Dabbs, Bill Garity, Milton Shaw, and Eugene Roden

5. Sturm, to the right of the large pipe, and colleagues study in a mechanical engineering laboratory in 1943. Robert Maxwell is to the left of the pipe.

The University of Tennessee, Knoxville  
 Dept. of Mechanical, Aerospace & Biomedical Engineering  
 1512 Middle Drive  
 414 Dougherty  
 Knoxville, TN 37996-2210  
 RETURN SERVICE REQUESTED (#xxx)

Nonprofit Org.  
 U.S. Postage  
 PAID  
 Knoxville, TN  
 Permit No. 481

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.



Matthew M. Mench ..... Department Head  
 Toby Boulet ..... Assoc. Dept Head, Undergraduate Programs  
 Gary V. Smith ..... Assoc. Dept Head, Graduate Programs  
 Jindong Tan ..... Assoc. Dept Head, Integrated Programs & Activities  
 Kivanc Ekici ..... Director of Graduate Programs  
 Kathy Williams ..... Editor  
 Amanda Andrews ..... Contributor  
 Jenna Elkins ..... Contributor  
 David Goddard ..... Contributor  
 Kim Cowart and Randall Brown ..... Editorial Assistance

Dean's Office ..... 865-974-5321  
 Office of Engineering Development ..... 865-974-2779  
 UT Alumni Association ..... 865-974-3011  
 MABE website ..... mabe.utk.edu

E01-1370-003-15

