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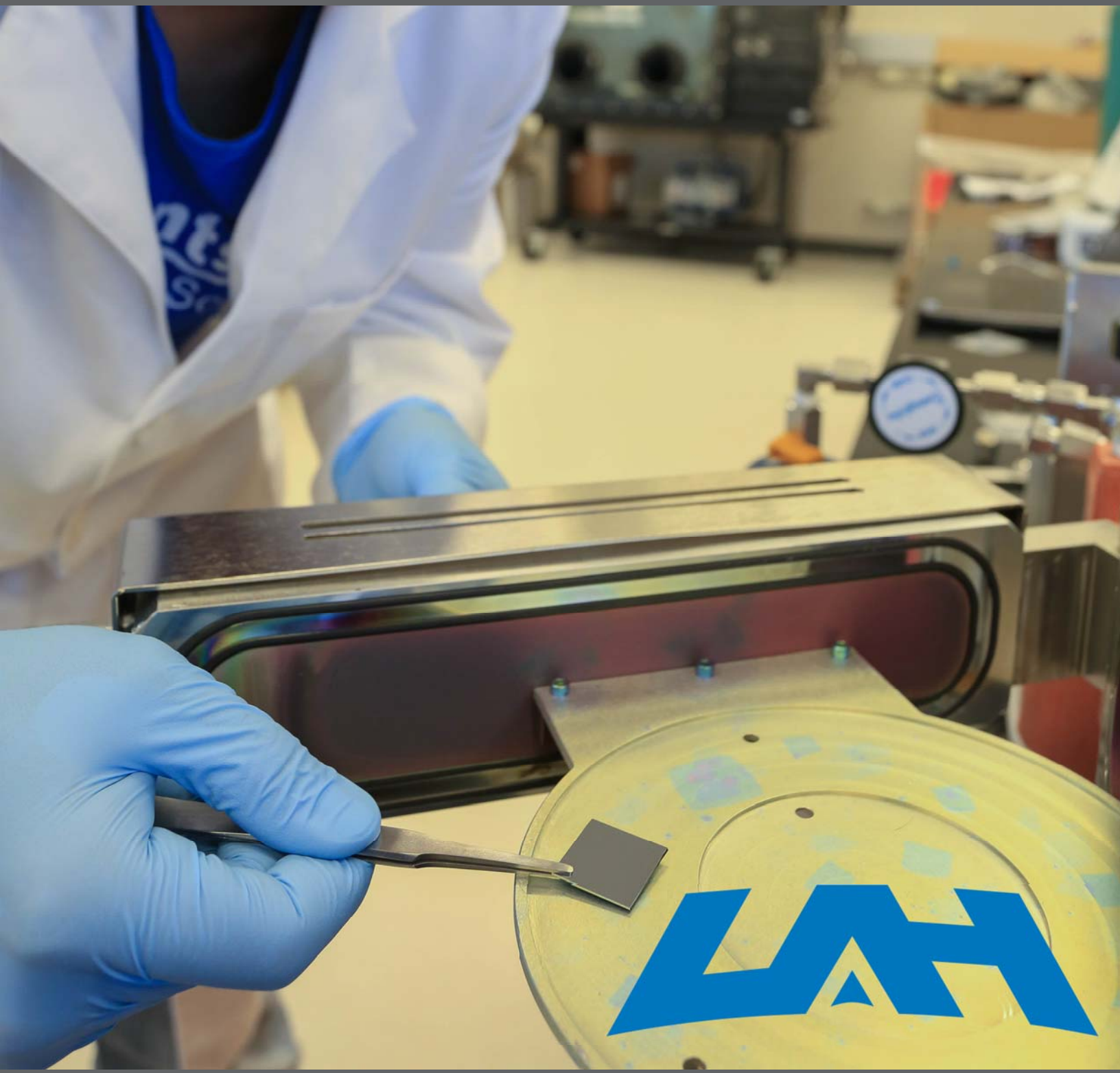
Fall 2014

Go Innovate●**Learn** Integrity●**Be** Inspiring



THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

COLLEGE OF ENGINEERING

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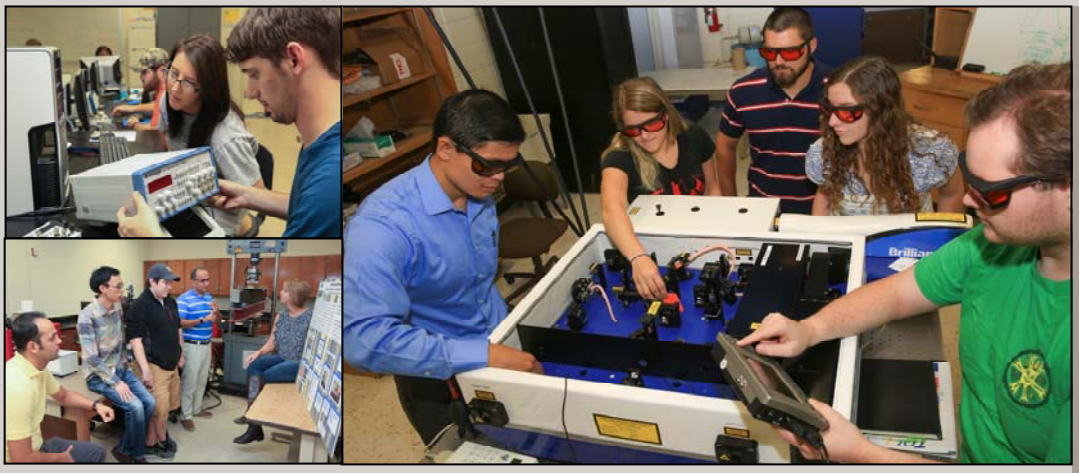

DEPARTMENTS & ARTICLES

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The College of Engineering (COE) at UAH publishes news and information on current research, academic programs, and student achievements. To reproduce material contained in this newsletter, please contact the COE Dean's Office at:

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CHARGER GIVING

Friends and alumni can assist our mission by providing financial support and resources that will contribute to the College's strategic research and educational goals. Consider giving to support both undergraduate and graduate student scholarships, to fund faculty endowments, and to enhance research and educational facilities and programs.
To learn more about giving options, please contact the Dean of Engineering, Prof. Shankar Mahalingam at shankar.mahalingam@uah.edu or 256.824.6474, or the Vice-President for Advancement, Mr. Robert Lyon at robert.lyon@uah.edu or 256.824.6501.

BECOME A CHARGER

Faculty: The College of Engineering (COE) has several open tenure-track faculty positions. For more information, go to www.uah.edu/engineering and go to Faculty Search 2014. UAH is an affirmative action, equal opportunity institution.

Graduate Students: The COE offers MSE and PhD degrees in a broad range of engineering disciplines. College faculty lead strong research programs to support student research projects. For more information on graduate programs, go to www.uah.edu/engineering.

Undergraduate Students: The COE offers the B.S. degree in 8 ABET-accredited programs: Aerospace, Chemical, Civil, Computer, Electrical, Industrial & Systems, Mechanical, and Optical Engineering. Undergraduate students have numerous hands-on opportunities including nationally recognized engineering teams, undergraduate research, and cooperative education and internship programs. For more information go to www.uah.edu/eng/departments/undergraduate-engineering.

launch

Engineering at UAH | Fall 2014

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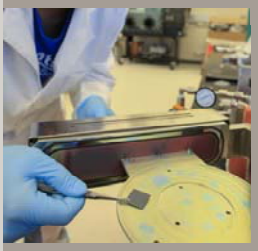


ON THE COVER

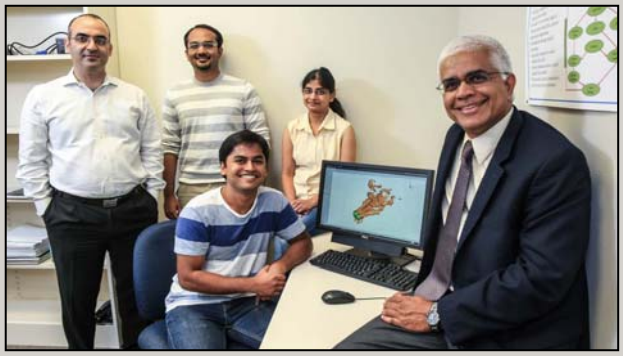
CME Prof. Lei and MAE Prof. Nelson's Fuel Laboratory

LETTER FROM THE DEAN

The UAH campus continues to evolve and student life is undergoing a rapid transformation. In 2013 for example, the campus greenway was completed and in 2014, the long awaited Charger Union building was opened. This 100,000 sq. ft. building serves as a focal point for student life amenities and engagement. It offers productive workspaces including small and medium–sized conference rooms and a place to relax and meet with other students, faculty, and staff in an informal setting. Undergraduate enrollment in the College of Engineering rose by 3.3%, and our first-time-full-time engineering freshmen numbers increased dramatically by 23% in just the last year. UAH awarded 281 BS, 151 Masters, and 14 PhD degrees in Engineering over this period.

Since publication of our 2013 newsletter, seven COE faculty members have retired. They include ECE Professors Reza Adhami, John Jarem, and John Stensby; CME Professors C. P. Chen, and Jim Smith; CEE Professor Kate Leonard; and MAE Professor Don Wallace. These long-time faculty represent a combined 217 years in research, teaching, and service contributions to generations of our undergraduate and graduate students! We are most grateful to them for their dedication to UAH and wish them well in their future pursuits. We are particularly delighted to welcome several outstanding faculty members to our College in the areas of systems engineering, atomistic and multi-scale computation of material properties, sustainable water treatment, advanced composites for structural engineering, and gas turbine heat transfer and propulsion systems. You can learn more about them in this newsletter.

UAH alum Falco Girgis (BSE, 2011), who is now pursuing a MSE degree in Computer Engineering, recently signed a publishing deal with development company WaterMelon for his programming brainchild *Elysian Shadows*. This is a next generation 2D role playing game that fuses aspects of 16-bit classical role-playing games with modern rendering and audio techniques. Earlier this year, our concrete canoe team placed 3rd in the Southeastern Regional competition held in Tampa, FL, while our Steel Bridge Team, competing for the first time, placed 11th overall. Three of our seniors, Anna Hester, Rachel Stewart, and Sarah Cates, traveled to ESTACA in Paris, France to meet with their engineering student colleagues. Together they are working on a joint integrated product team as part of their ISE senior design project involving an interplanetary mission.



Left to Right: Prof. B.Shotorban, graduate students B.L. Yaswanth, and C. Anand. Seated Left to Right: Graduate student S. Padhi and Dean Shankar Mahalingam.

Our faculty research activities continue to attract national attention. This past summer, 10 students from around the country participated in summer research projects related to unmanned systems through a National Science Foundation (NSF) funded program focused on *Research Experiences for Undergraduates*, led by Professor Farbod Fahimi of the MAE Department. Professor Mike Anderson is Principal Investigator on a $1.2 million grant from ALDOT that has enabled UAH to acquire a high-tech driving simulator that will be used to provide hands-on training to rural transit operators throughout Alabama. Professors Phil Farrington (ISEEM) and Gang Wang (MAE) are site directors for two multi-university research proposals aimed at establishing NSF Industry/University Cooperative Research Centers on Advanced Composites in Transportation Vehicles, and the Southern Alliance for Advanced Vehicle Manufacturing.

These are just a few examples of the amazing accomplishments featured in this year's edition of launch. I am pleased to express our appreciation for the strong support we enjoy from our University leadership, academic colleges and research centers on our campus, the Huntsville community, federal, state, and corporate research and scholarship sponsors, our students and their families, our alumni, and our friends of the College and University.

Best regards,

Shankar Mahalingam
Dean of Engineering

$1.2 Million Driving Simulator Finds Home at UAH

The University of Alabama in Huntsville is pleased to announce the arrival of a brand-new high-tech driving simulator, which will be used to provide hands-on training to rural transit operators throughout the state.

Known as RIDE (Real-Time Instruction for Driver Education), the simulator is funded by a $1.2 million grant from Alabama Department of Transportation (ALDOT) and will be located outside of Olin B. King Technology Hall on the UAH campus. Its operation will be overseen by the Department of Civil & Environmental Engineering in the College of Engineering.

Prof. Michael Anderson
CEE Department

"We are really excited to be able to offer this training opportunity to rural transit operators in Alabama, who provide an important service to underserved populations living in less accessible areas of the state," says Prof. Michael Anderson, coordinator of the RIDE program. "We hope to one day expand it to include the many state agencies that also provide transportation to the elderly and disabled."

The simulator's curriculum will include decision driving, close-quarters maneuvering, accident reduction, and passenger and driver safety. Additional scenarios can also be developed on an as-needed basis using RIDE's non-mobile companion simulator, which will be housed in the Department of Civil and Environmental Engineering.

"RIDE would not have been possible without the support we've received from ALDOT, and we look forward to partnering with them on this educational outreach initiative," says Prof. Anderson.

Interior view of Real-Time Instruction for Driver Education (RIDE) simulator

Real-Time Instruction for Driver Education (RIDE) Simulator

For more information about RIDE, contact Prof. Anderson at michael.anderson@uah.edu or 256.824.5028

For more information about the CEE Department, go to uah.edu/eng/departments/cee or contact Prof. and CEE Chair Houssam Toutanji at toutanh@uah.edu or 256.824.6370

Advancing Systems Engineering

The Department of Industrial and Systems Engineering and Engineering Management (ISEEM), is developing a world-class research program in Systems Engineering. NASA is our leading sponsor, with the Space Launch System-funded research program in Systems Engineering. This fundamental investigation of how systems engineering is done and how it might be improved, has an emphasis on theory, a foundation in physics and organization science, and a focus on practical near term application. The research is grounded in Dr. Michael Griffin's definition of elegant design, which looks at effectiveness, efficiency, robustness, and avoiding unintended consequences. The ISEEM Department is pursuing projects in each of these areas under the leadership of Prof. Phil Farrington and the guidance of Dr. Mike Watson, our NASA technical lead.

The NASA program is funded at $3.5 million over five years, making it NASA's largest single systems engineering research program. We are now in the third year, and results are rolling in. Major areas of investigation include applying energy analysis to rocket system efficiency, developing value models to guide large systems design programs, cost analysis based on information theory, and understanding how decisions are made and implemented within a large design organization.

About half of the program funding is distributed to a consortium of universities pursuing related projects, led by UAH. Stephen Johnson at the University of Colorado, Colorado Springs, is developing a method to design more reliable space systems through state transition analysis and modeling with fault trees. Maria Yang at MIT is studying how NASA engineers conceive of and communicate new design concepts. Rich Malak at Texas A&M is integrating a measure of robustness into design decision making. The University of Dayton, Iowa State, and George Washington University are doing additional systems engineering research projects within the consortium.

The National Science Foundation (NSF) is funding complementary research in the ISEEM department. Prof. Paul Collopy is leading two NSF projects. The first is developing a simulation of a large engineering organization to study systems engineering processes, in collaboration with Georgia Tech. The second is an investigation of applying performance measurement and control theory to guide a systems engineering project.

Four of ISEEM's graduate students are are fully funded by the NASA and NSF projects. **Andrew Gilbert** is applying energy to rocket analysis, **Joel Roberson** is building value models for the Space Launch System, **Kenton Barber** is applying information-based costing to NASA rockets, and **Samantha Kuhn** is exploring performance measurement and control as a systems engineering technique. In addition, NSF funded three students for summer research this year: **Parker Strickland** an undergraduate here at ISEEM, Selin Aydin, a masters student at Univ. of Florida, and Vanessa Dongmo, an undergraduate student from Univ. of Oklahoma

Prof. P. Farrington, ISEEM Department

Prof. P. Collopy, Chair, ISEEM Department

For more information about ISEEM programs, contact:

Prof. Farrington at phillip.farrington@uah.edu or 256.824.6568

Prof. Collopy at paul.collopy@uah.edu or 256.824.6749

For more information about the ISEEM Department, go to uah.edu/eng/departments/iseem

ECE Professor Named Alabama Launchpad Inventor of the Year

In September 2014, ECE Department Prof. Emil Jovanov was named Inventor of the Year by Alabama Launchpad. Prof. Jovanov's most successful patent is a smart pill bottle that notifies you to take your medication, reminds you if you missed a dose and can alert your doctor or pharmacist if you are missing doses. It is currently in production and clinical testing by patent licensee AdhereTech, which championed Prof. Jovanov's nomination.

The smart bottle is just one of Prof. Jovanov's mobile health (*mHealth)* projects, part of a 15-year research endeavor to develop technologies that can improve people's health and quality of life. His lab's spinoff technologies have been pursued by companies such as Huntsville's Halo Monitoring.

In 2000, Prof. Jovanov was the first to propose a system to wirelessly integrate sensors *ex* and *in vivo* and communicate through the internet for ubiquitous human health monitoring. As the number of aging “Baby Boomers” increases so will the demands on physicians and healthcare workers, who are looking to technology to help meet the needs of their patients. Prof. Jovanov’s *mHealth* systems are considered the architecture of choice for a new generation of personalized and predictive healthcare. In the near future, he sees full integration of personal monitors with ambient intelligence technology, an effort driven by the "Internet of things" to make a system sensitive and responsive to people. The result could be monitoring systems that allow people to stay at home longer as they age and improve their quality of life.

"We are very proud of Prof. Jovanov's achievement and believe this award is deserving recognition of his entrepreneurial skills and his attention to real-world problems," says Prof. Ray Vaughn, UAH Vice-President for Research and Economic Development. "We have a wealth of talented faculty at UAH who are able to use their expertise to move solutions to the commercial market space. We support these efforts and have a strong infrastructure to do so at the university."

Prof. Emil Jovanov, ECE Department

For more information, contact Prof. Jovanov at emil.jovanov@uah.edu or 256.824.6632.

For more information about ECE Department research go to uah.edu/eng/departments/ece

Tech Trek at UAH by AAUW

Changing the World for Good

In July 2014, UAH hosted its first-ever Tech Trek, a weeklong residential camp to promote interest in the science, technology, engineering, and math (STEM) fields among rising eighth-grade girls. And by every measure, says Camp Director Prof. Rhonda Gaede, it proved to be a wonderful success.

Prof. Rhonda Gaede, ECE Department

"On Sunday, the girls were names on forms to me. By Friday, they were friends that I hated to see go. On more than one occasion, parents used the words life-changing and once in a lifetime about the camp", says Prof. Gaede, who also serves as an associate professor of Electrical and Computer Engineering at UAH. "The girls said that at school it was about getting the right answers but at Tech Trek, it was about exploring possibilities, understanding that failure is part of the process. The process is so much more important than any answer because the questions are going to change during the course of a forty year career."

The camp, a partnership between the American Association of University Women (AAUW) at the national level and the University of Alabama in Huntsville, served forty eight girls from across northern Alabama. Mornings, each took part in activities related to their chosen area of interest: Robotics, App Development, or Life Science. Afternoons, they participated in common workshops that challenged them with everything from designing and racing moon buggies to making slime.

The camp also included STEM-oriented field trips to the U.S. Space & Rocket Center, Dynetics, and the HudsonAlpha Institute for Biotechnology. As part of the visit to HudsonAlpha, the girls participated in Professional Women's Night "one of the most popular activities of the camp by far" says Prof. Molly Johnson, (UAH History & Women's Studies), who served as marketing coordinator for the camp. Set up like a speed-dating event, the girls were able to speak one-on-one with women who have found success in STEM-related careers. "They got there expecting to be lectured to, but instead it was this amazing interactive experience," says Prof. Johnson. "Every single girl was blown away."

Indeed, many of the students' comments about their week as Tech Trekkers underscored the impact not just of that particular night, but also of the camp in general.

> *"It has opened my eyes to how hard I need to work to reach my goal, and I know that I will be studying a lot harder this year."*
>
> *"It made me feel like I can be anything I want to be."*
>
> *"I feel better about being a stereotypical 'nerd.' I cannot wait to take every STEM class that I can get my hands on!"*
>
> *"This has made me so excited and makes me look forward to my future as a road filled with possibility."*

"Integral to the camp's success, of course, was the support of its sponsors: UAH Office of the President, UAH College of Engineering, Jacobs Engineering, Fishman and Curry Foundation, Alabama EPSCoR, Verizon, AAUW-Huntsville branch, Inspire and Achieve, Lockheed Martin, Dr. Jan Davis, Ms. Ruth Jurenko, and Ms. Eleanor S. Lienau.

Now, with this year's camp complete, Prof. Gaede and her fellow organizers are in the early stages of planning for next year. "In the spirit of continuous improvement, there are some things we could do even better next year, but we are very proud of what we accomplished. This first year will always be special to us," she says. "Our outreach efforts to teachers and girls only went as far as Birmingham this year. In future years, we hope to involve girls from all over the state of Alabama."

Contact Prof. Gaede at rhonda.gaede@uah.edu or 256.824.6573

Faculty News

Two Key NSF I/UCRC Research Centers Planned at UAH

Prof. Gang Wang, MAE Department

Mechanical and Aerospace Professor Gang Wang is the site director for a planned National Science Foundation Industry/University Cooperative Research Center (NSF I/UCRC) for ***Advanced Composites in Transportation Vehicles (ACTV)*** with Mississippi State University serving as the lead institution. The ACTV Center is envisioned to advance composite materials and structures technologies through transformational research, establishment of industry-university-national laboratory partnerships for robust economic growth, and training of a skilled workforce. Research and education at the Center will help remove barriers for increased usage of composites and improve innovation capacity of industry to provide significant growth opportunities for US manufacturing. The principle investigator (PI) for the Center is Professor Ratan Jha at Mississippi State University. In addition to Prof. Wang, UAH faculty and researchers from several departments and centers are participants including Houssam Toutanji, Chris Sautter, Mark Lin, William Kaukler, Wayne Thompson, Nick Zhou, and Ken Zuo. Following an NSF funded planning meeting in July, MSU and UAH submitted a full proposal in September. Once funding is approved, the ACTV Center is expected to be launched in Spring 2015. For more information about this program, contact Prof. Wang at gang.wang@uah.edu or 256.824.6209.

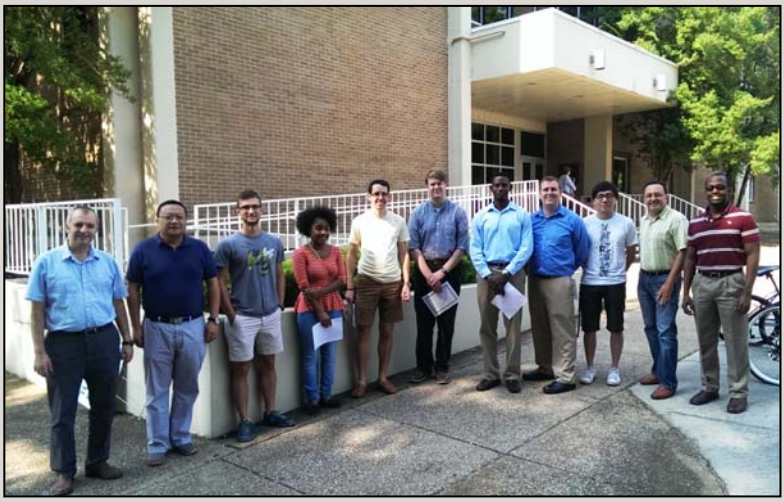
Prof. P. Farrington, ISEEM Department

Lead institution Auburn University and partners UAH and Tennessee Technological University are collaborating in the creation of the ***Southern Alliance for Advanced Vehicle (SAAV) Manufacturing Center***. With NSF I/UCRC planning grant funding, participating researchers from all three institutions and representatives from industry and government organizations met in Huntsville in November. The center will have sites at each campus, and the trio of universities is already in discussions with Clemson University, Louisiana State University and the University of Alabama about possible future expansion. Core thrust areas for the SAAV Manufacturing Center will include manufacturing systems design; technologies and processes for mass customization, including using lightweight-high strength materials or additive manufacturing; lean manufacturing and management; data- driven approaches for advanced quality control; and occupational safety and ergonomics. The PI for this center is Professor John Evans from Auburn University. UAH's site director is ISEEM Professor Phil Farrington. UAH's team includes Sampson Gholston, Sherri Messimer, and Sara Graves. At this time, the tri-campus team plans on submitting a full proposal in Spring 2015, with a planned center launch in Fall 2015. For more information about this program, contact Prof. Farrington at phillip.farrington@uah.edu or 256.824.6568

NSF REU in Unmanned Systems

Prof. F. Fahimi, MAE Department

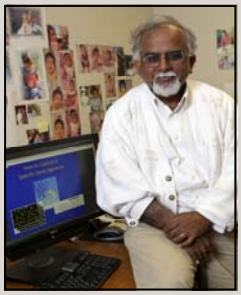
MAE Professor Farbod Fahimi is the principal investigator of a summer research internship program funded by NSF's Research Experience for Undergraduates (REU) program. Dr. Fahimi's program is titled "Fundamental Research Topics Related to Unmanned Systems," and provides summer support for engineering and science students from around the country. In its first summer, ten top undergraduate students from diverse institutions in the nation participated in research projects defined by six UAH professors in the College of Engineering and the College of Science. The REU program will continue until 2017.



Prof. F. Fahimi's first REU student group

information contact Prof. Fahimi at farbod.fahimi@uah.edu.

& Highlights



Prof. K. Chittur, CME Department

Krishnan Chittur, Professor and Interim Chair of CME, continues to spend time at the HudsonAlpha Institute for Biotechnology advising students, collaborating with the Educational Outreach Department and pursuing ideas in DNA diagnostics and bioinformatics. During DNA Day 2014, Prof. Chittur talked to two high schools across Alabama about the role of engineering in the biomedical sciences.

Prof. B. Shotorban MAE Department

MAE Professor Babak Shotorban has received a three-year NSF award to investigate fundamental charging of dust in complex plasmas. The project will be conducted in collaboration with Baylor University. The award amount is $135,000.

A three-year NSF award in the amount of $202,413 has been won by MAE Professor George Nelson. He will be studying alloys for high-capacity anodes in Li-ion batteries. This work is being performed in collaboration with researchers at Texas A&M University.

Prof. G. Nelson, MAE Department

CME Professor Jeff Weimer spent the Summer of 2014 with a ten week position as a Summer Fellow at the Naval Research Laboratory in Washington DC, working the Molecular Interfaces and Tribology Section of the Chemistry Division under the direction of Dr. K. Wahl. His key responsibility was to set up the operation of three tribometer systems to study friction and wear. He resurrected a pin-on-disk system and a reciprocating arm tribometer. He also initiated the maiden run of a spinning-wheel tribometer designed specifically by Dr. Wahl to perform bench-top troubleshooting for larger-scale problems on naval systems. His studies focused on root-cause analysis and fundamental issues behind failure of rubber on metal sliding as well as on whether proof could be found for ultra-low-friction coefficients during diamond-on-diamond contact sliding. He brings back extensive hands-on experience with the use of a research-grade optical microscope to image materials surfaces in reflection, cross-polarization, and phase contrast modes at magnifications up to 1000x or better.

Prof. J. Weimer, CME Deptartment

Dr. Sarma Rani and his collaborator at Cornell University will be undertaking a three-year computational study of the role of turbulence in the formation of precipitation in cumulus clouds. The NSF award is $173,000.

Prof. S. Rani, MAE Department

Engineering faculty have designed two Massive Open On-Line Courses (MOOCs). In the spring of 2014, Prof. Krishnan Chittur offered a MOOC designed to educate high-school students on key topics and disciplines covered in chemical engineering, and what they may be able to do when they graduate. Over 250 students signed up for this class which introduced them to Chemical Engineering through a Review of the Enabling Sciences. The second launch of Prof. Chittur's MOOC began Fall 2014.

A second Engineering MOOC will launch in the Fall 2015, taught by MAE Professor Brian Landrum. The course, *Foundations of Engineering: Soaring to Success*, will review key concepts of mathematics and physics and explore how to apply these concepts in engineering analysis and design of a system. The engineering system, based on Google's Project Loon, is a balloon enabled system for delivering internet service to underserved areas, particularly in the developing world.

Prof. B. Landrum, MAE Department

More information on the Engineering MOOCs may be found at:
CHE MOOC uahcoe.populr.mecoemooc_chemical_engineering101_fall2014
MAE MOOC uahcoe.populr.me/

College of Engineering Introduces New Faculty

Dr. Phillip Ligrani is new Eminent Scholar in Propulsion

Prof. Phil Ligrani

Phillip Ligrani joined UAH as a Professor of Mechanical and Aerospace Engineering and Eminent Scholar in Propulsion. Prof. Ligrani earned his PhD in Mechanical Engineering from Stanford University. He is a Fellow of the American Society of Mechanical Engineers (ASME). Previously, Prof. Ligrani was the Oliver L. Parks Endowed Chair, and Professor of Aerospace and Mechanical Engineering at Parks College of Saint Louis University. Prior to that appointment, he was the Donald Schultz Professor of Turbomachinery in the Department of Engineering Science at the University of Oxford. Phil's research expertise includes propulsion, shock-wave-boundary-layer interactions, aerodynamic losses, turbomachinery, gas turbine component heat transfer and cooling, convective heat transfer, and fluid mechanics, as well as micro-fluidics, fractionation, and separation science. Phil has coauthored over 150 peer-reviewed journal publications. His research at St. Louis University was funded by Solar Turbines, The Boeing Company, IHI Corp. (Japan), Honeywell International Corp., and the NSF.

Prof. Nick Zhou

Hongyu (Nick) Zhou joined UAH as an Assistant Professor of Civil and Environmental Engineering. Prof. Zhou received his PhD in Civil Engineering from Arizona State University in 2013.. Prof. Zhou's research interests include the development and characterization of innovative infrastructural materials, structural multi-hazards damage mitigation, advanced composite materials, and micromechanics. His PhD research was funded by the Department of Homeland Security (DHS) and the NSF. In 2012, he received a DHS fellowship to perform joint research with Oak Ridge National Laboratory (ORNL) to study the microstructures and micromechanical behaviors of advanced composites.

Prof. Bryan Mesmer

Bryan Mesmer joined UAH as an Assistant Professor of Industrial and Systems Engineering. Prof. Mesmer earned his PhD in Mechanical Engineering from the State University of New York at Buffalo in 2012. He worked as a Postdoctoral Research Associate in the Department of Aerospace Engineering at Iowa State University for the past two years. Bryan's background is in design theory, and modeling of decisions and uncertainties. His work has focused on improving the design process, particularly for large-scale complex systems. His research interests are in system design architecture, interactions in systems and design, incorporation of end-user models and simulations in design, and integration of new system and design processes in government and industry practice.

Prof. Tingting Wu

Tingting Wu joined UAH as an Assistant Professor of Civil and Environmental Engineering. Prof. Wu earned her PhD in Environmental Engineering from the University of Florida in December 2010. Her doctoral research involved development and evaluation of engineered media that can be utilized to remove dissolved phosphorus in urban waters from both point and non-point sources. Most recently, Prof. Wu worked as a Postdoctoral Associate at the University of Miami focusing on the development of design principles for low-energy, low-emissions net-zero water buildings of the future. Her research interests include sustainable water/wastewater treatment and reuse, and storm water/non-point source pollution control.

Prof. Eunsoek Lee

Eunsoek Lee joined UAH as an Assistant Professor of Mechanical and Aerospace Engineering. Prof. Lee received his PhD in Mechanical Engineering with a minor in Physics from Stanford University in 2011. Most recently, he worked as a Postdoctoral Fellow within the Environmental Energy Technologies Division at Lawrence Berkeley National Laboratory in Berkeley, CA. His research interest is in the application of atomistic and multi-scale computational methods and data-driven science to the study of mechanical engineering, with emphasis on energy storage materials like solid oxide fuel cells, Li-ion batteries, and primary batteries. Several federal agencies and industrial partners have funded his research. He is also a key contributor the DOE Materials Genome Center.

Engineering Faculty Retirements: Over 200 Years of Service

Dr. Reza Adhami, Professor and former Chair of Electrical and Computer Engineering, received his PhD degree in Electrical Engineering from UAH in 1985. His teaching and research areas of focus are in digital signal processing, digital image processing, biometrics, pattern recognition and voice recognition. His research contributions include the development of unique applications of wavelet transform that utilize vibration analysis, mammographic lesion classification, localized computed tomography, and data compression. During his career, Prof. Adhami has been the advisor of 14 PhD students, and 20 MS thesis students.

Dr. C.P. Chen, Professor and Chair of Chemical and Materials Engineering, received his PhD degree in Chemical Engineering from Michigan State University. Prof. Chen started his career at NASA working on turbulence issues with rocket engines. He joined the CME department and built a large research group in Computational Fluid Dynamics and attracted significant funding from NASA and DOD. Prof. Chen has made contributions to multiphase flows, spray combustion, turbulence modeling, aero-optics, etc. At UAH he supervised the dissertations of approximately 10 PhD students. C.P Chen is a Fellow of ASME and Associate Fellow of AIAA.

Dr. Charles Corsetti, Lecturer and Assistant Chair of Electrical and Computer Engineering, received his PhD in Electrical Engineering at the Air Force Institute of Technology. Dr. Corsetti coordinated the department's ABET accreditation activities for the Electrical Engineering Program and taught a variety of courses and supervised the capstone senior design course. Dr. Corsetti started the undergraduate high altitude balloon program at UAH, under the sponsorship of the Alabama Space Grant Consortium (ASGC), with its first payload launch in Fall 2002. To date, the program continues and has resulted in the launch and successful recovery of over fifty high altitude balloon payloads by undergraduate students.

Dr. John Jarem, Professor of Electrical and Computer Engineering received his PhD degrees in Electrical Engineering from Drexel University in 1975. He came to UAH in 1987 after serving as a faculty member at the University of Petroleum and Minerals, Dhahran, Saudi Arabia, and at the University of Texas at El Paso. His research area was electromagnetics and he is first author, of the book: Computational Methods for Electromagnetic and Optical Systems. His research in electromagnetic scattering from vegetation/ground surfaces for the last five years was supported by AMRDEC. Prof. Jarem is a Senior Member of IEEE.

Dr. Kate Leonard, Professor of Civil and Environmental Engineering, received her PhD in Environmental Engineering from UAH. Her areas of research include waste water treatment, sustainability in designs related to water supply and water treatment systems, and engineering education. She coordinated the Fundamentals of Engineering preparation course for generations of students enabling them to eventually get their PE license. In 2005, she was elected as Fellow of the ASCE. In 2014, she won a "Paper of the Year" award from the ASCE Journal of Professional Issues in Engineering Education and Practice.

Dr. James Smith, Professor of Chemical and Materials Engineering, received his PhD in Chemical Engineering from the University of South Carolina in 1982. He joined UAH in 1982 to start the Chemical Engineering Program at UAH. His strategy was to identify chemical engineering PhD's in Huntsville who were working as researchers at UAH or at NASA and convince them to join the department. He supported graduate four students with PhD dissertations and nearly 30 Masters students with theses. Prof. Smith is a Senior Member of the AIAA. He is a volunteer diver escorting space camp students with their first diving experiences.

Dr. John Stensby, Professor of Electrical and Computer Engineering received his PhD degree at The University of Alabama Tuscaloosa, He joined the ECE faculty in 1984 after teaching at the University of Kansas and Texas A&M University and working for Texas Instruments in Dallas, TX, and Rockwell International in Anaheim, CA. His main technical areas of interest include communication systems, applied mathematics and numerical methods. He helped pioneer the application of bifurcation theory to the field of phase-locked loops, establishing the connection between separatrix cycle bifurcation and certain types of nonlinear PLL behavior.

Dr. Don Wallace, Professor of Mechanical and Aerospace Engineering, joined the Mechanical Engineering Department (before it was MAE) as an Assistant Professor in 1974. He received his PhD in Mechanical Engineering from the University of Wisconsin. Prof. Wallace's research activities focused on performance evaluation of photovoltaic systems and residential heating and air conditioning systems. He has been recognized with numerous teaching and professional service awards including the Outstanding Engineering Professor Award and the UAH Foundation Distinguished Teaching Award .

Engineering Student D

MAE/CPE Senior Design Team Demonstrates Potential for UAVS

Students in the Spring 2014 MAE 494 Aircraft Design class built an outstanding Unmanned Aerial System (UAS) that won second place at this year's AIAA Region II Student Team Design Competition. The sixteen students under the direction of Professor Brian Landrum designed and constructed a helium-filled airship that functions as the mother ship for a small quad-rotor Unmanned Aerial Vehicle (UAV). The airship carries batteries that charge the UAV through a remote-controlled capture and release docking mechanism. Serving as a moving home base, the airship enables the UAV to perform shorter and closer scanning flights for functions such as aerial agriculture mapping, forest fire detection, search and rescue missions, and defense applications.

UAH Senior Design Team

Designed and built by students using UAH's Engineering Design and Prototyping Facility (EDPF), the airship began as a 20-foot-long helium-filled polyurethane envelope donated by Southern Balloon Works. An active weight distribution system keeps the craft level, and a 750 kilovolt motor provides forward motion. Both the airship and the UAV, supplied by UAH's Systems Management and Production Center, carry cameras that feed live video to ground monitors. The remote control software was written by students from CPE 495, a senior-level Computer Engineering design class under the direction of electrical engineering Professor Earl Wells. Final testing of the system was done inside Huntsville's Von Braun Center. The airship released the UAV which then flew by remote control before successfully re-docking with the airship.

The Bench Warmers—EE Senior Design Team

SPCB outside Engineering Building on the UAH campus

A team of electrical engineering students built and installed a solar-powered charging bench (SPCB) at Charger Way and John Wright Road. A ribbon cutting to celebrate the new addition to campus took place on Tuesday, Nov. 25, 2014 after which the bench became available for public use.

Powered by renewable energy, the SPCB will provide a place for students, faculty, and visitors to easily charge their mobile devices while enjoying the outdoors. The students involved – ***Patrick Doyle, Ashley Johnson, Beverly Martin, and Donna Baughn*** – created the bench for their senior design project, a requirement of UAH's electrical engineering undergraduate degree program.

The team's goal, says Baughn, was to design something that would "not only reflect our passion for giving back to the community and contributing in a positive way, but would also use renewable energy." Dennis Hite, a lecturer in the Department of Electrical and Computer Engineering, served as an advisor to the group, known collectively as "The Bench Warmers." The project also received invaluable support from two community partners, Jacobs Engineering and TVA. Johnson, who served as The Bench Warmers' Research Lead, calls the result a "win-win," particularly when you take into account that 90% of American adults own cell phones, tablets, and laptops – all of which need recharging. "Now people can take a break from their busy lives and enjoy the nice weather we have in Huntsville, while sitting outdoors and recharging their personal devices," she says.

esign Team Highlights

ISE Senior Design: Integrated Product Teams (IPT)

STRATOS (System Testbed Researching the Atmosphere, Terrain, and Outer Space) is a Space and Missile Defense Command (SMDC) project. The teams will design and build a smartphone-based CubeSat that will eventually fly on a high altitude balloon. The science objective of the CubeSat was defined by the College of Charleston, while UAH designed and built the spacecraft bus (structures, thermal, control, communications, data handling, etc). The CubeSat will be launched on a high altitude balloon during the Spring 2015 semester.

UAH and ESTACA Partners

Europa Jupiter System Mission (EJSM) is a NASA project. The teams designed a conceptual robotic interplanetary spacecraft mission to Europa, a moon of Jupiter. The science objectives of the mission was defined by the College of Charleston. ESTACA University in Paris, France, will design the orbiter. During the Fall semester, UAH teams worked on the complete mission architecture, performing trades for the orbiter and the lander. During the Spring 2015 semester, they will perform a detailed design of the lander.

UAH ASCE Teams Shine in Tampa

The UAH concrete canoe team finished 3rd this year in the 2014 Southeastern Regional competition held in Tampa, Florida. This was one of the largest and most competitive student competitions the team faced, where 24 teams competed in 14 different competitions. So far, Team UAH has proudly represented the Southeast Region sixteen times at the national level. Team UAH has 5 national wins and three 2nd place finishes to their credit.

The UAH Steel Bridge Team also competed in the Southeast Regional Competition, finishing 11th out of 24 overall. The team placed 8th place in structural efficiency. The 11th place finish was also the best of all the Alabama universities. This was the first time UAH has competed in the Steel Bridge competition in over eight years. The goal for this year was simple: to build a bridge that could finish the competition. With that goal in mind, the UAH Steel Bridge Team is now looking to finish in the top 4 to qualify for nationals next year.


UAH ASCE Teams and Faculty Sponsors

For more information, visit:
www.TeamUAH.org
Or follow them on Facebook at
www.facebook.com/groups/uah.asce.

Honors

In April 2014, UAH held the formal University Honors Convocation. As part of the day-long celebration for Honor's Day, the College of Engineering at UAH hosted an individual ceremony for our top performing UAH students, held in the Charger Union Theater. This year, in addition to honoring the very top students and all students that made the Deans List, the College also recognized outstanding COE faculty and staff, and the top Engineering student organization.

Most Outstanding Engineering Student

l-r: Dean Mahalingam, S. Patel, R. Lindquist

Mr. Sunny Patel was awarded the Most Outstanding College of Engineering Student for 2014. Sunny is from Ahmedabad/Gujarat/India. He transferred to UAH in the fall of 2011 to major in Computer Engineering. Sunny was a Software Developer intern with Mentor Graphics and worked on automating regression testing for PCB designs. He then interned with Adtran Inc. working on developing code with Unit Test. He also performed undergraduate research under ECE Prof. Aleksander Milenkovic. Sunny was a Pass Leader and a member of IEEE. He was inducted into the Tau Beta Pi, Phi Kappa Phi, and Eta Kappa Nu honor societies and he served as Vice-President of Eta Kappa Nu. He is also in the JUMP program. Upon graduation, Sunny will continue to pursue his graduate degree in Software Engineering.

AIAA Wins Student Organization Award

The most Outstanding Engineering Student Organization was awarded to the UAH AIAA student branch, which has demonstrated a commitment to education within the university, to STEM outreach in the community, to scholarly excellence, and to enriching their members' through activities and competitions. For example, in AIAA's 2014 Southeastern Regional Student Conference, MAE's 16 member team won honors in four divisions: Undergraduate, Team, Freshman/Sophomore Open Topic, and Outreach. In another example of outreach, the AIAA student group assisted the greater Huntsville section of the AIAA with the Great Paper Airplane Contest.

l-r: Dean Mahalingam, AIAA officers

Outstanding Faculty Awards

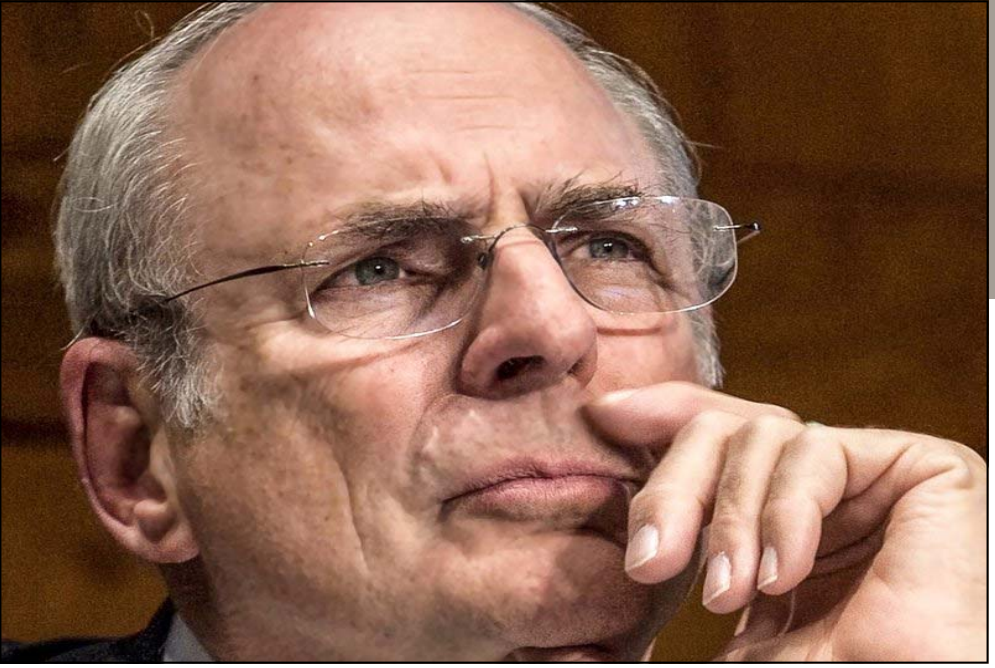
Faculty and staff were honored for the exceptional commitment to instruction and service to the College of Engineering and UAH. Dr. Ashraf Al-Hamdan was honored with the COE Outstanding Faculty Teaching Award. Ashraf has been teaching in the CEE Department since 2007. He received his PhD in Civil Engineering from the University of Illinois in 2002. He was nominated by several seniors in the Civil and Environmental Engineering Department.

Dr. Charles Corsetti was honored with the COE Outstanding Service Award. Besides teaching several EE courses (including senior design) Charles supports COE's outreach events such as Open House, Summer Camp, weather balloon launch and recovery, and programs with industry. He has been an EE ABET program coordinator for 15 years.

Ms. Annie Harris and Ms. Jennifer Perkins were both honored with COE Outstanding Staff Awards for their exceptional service to the College of Engineering Faculty and students.

l-r: Dean Mahalingam, Dr. Al-Hamdan

l-r: Dean Mahalingam, Dr. Corsetti, Dr. Lindquist



Norm Augustine (stock photo)

Norm Augustine: Distinguished Seminar Speaker

The College of Engineering welcomed Norm Augustine to UAH. Mr. Augustine, successful businessman, engineer, educator, and STEM advocate, recently served as a guest speaker for the October 2014 Distinguished Seminar, with the topic, "Science and Technology: Can America Still Compete?" Dean Mahalingam, notes, "Norm Augustine is perhaps among the most influential engineers of our time," due to his varied roles across industry, government, and the National Academy of Engineering.

Mr. Augustine is retired Chairman and CEO of the Board of the Lockheed Martin Corporation. Prior to joining Martin Marietta, he served as Assistant Secretary of the Army (R&D) from 1973-75 and Undersecretary from 1975-77. He was a Professor at Princeton, his alma mater, from 1997-99.

Mr. Augustine has been presented the National Medal of Technology by the President of the United States and received the Joint Chiefs of Staff Distinguished Public Service Award. He has five times received the Department of Defense's highest civilian decoration, the Distinguished Service Medal. He is co-author of The Defense Revolution and Shakespeare In Charge and author of Augustine's Laws and Augustine's Travels.

He served on the Boards of Black & Decker (now Stanley Black & Decker), Procter & Gamble and ConocoPhillips. Mr. Augustine was Chairman and Principal Officer of the American Red Cross for nine years, Chairman of the National Academy of Engineering, President and Chairman of the Association of the United States Army, Chairman of the Aerospace Industries Association, and Chairman of the Defense Science Board. He holds 33 honorary degrees and was selected by Who's Who in America and the Library of Congress as one of "Fifty Great Americans" on the occasion of Who's Who's fiftieth anniversary.

UAH College of Engineering Alumni Highlights

Ms. Robin Higgs (BSE Chemical Eng, 1996), was recently named the site manager of the 3M site in Decatur, Alabama. This is quite an achievement for Robin whose journey with 3M started as a manufacturing engineer in Decatur right after graduation. Robin has worked in management roles in multiple 3M locations including Cordova, IL, Cottage Grove, MN and Shanghai China where she spent three years starting a facility from the ground up and managed about 100 employees.

At the 3M Decatur site, Robin manages about 350 employees and the facility is expected to grow with additional chemical production capacity. As the site manager, Robin is responsible for managing the plant's day to day operations and setting the plant's direction for the future. "It's providing the leadership that fosters an environment of continuous improvement in environmental, health and safety, customer service and quality.", she states.

Mr. Falco Girgis, (BSE Computer Eng 2011), recently signed a publishing deal with development company WaterMelon for his programming brainchild Elysian Shadows. This is a next generation 2D role playing game that fuses aspects of 16-bit classical role-playing games with modern rendering and audio techniques.

Falco is lead programmer and also the de facto head of marketing – a job made somewhat easier by his already-popular YouTube channel, Gyrovorbis. Started with friends during his undergraduate days at UAH, Gyrovorbis is "a mixture of education and entertainment, like a reality show for video games," he says. Now, with more than 9,000 subscribers, it's also a great place to showcase Elysian Shadows and the effort that goes into creating a video game from scratch. Falco is currently pursuing a MSE degree in Computer Engineering at UAH.

Degrees and Majors

Bachelor of Science

Aerospace Engineering (BSAE)
Chemical Engineering (BSCHE)
Civil Engineering (BSCE)
Computer Engineering (BSCPE)
Electrical Engineering (BSEE)
Industrial & Systems Engineering (BSISE)
Mechanical Engineering (BSME)
Optical Engineering (BSOPE)

Master of Science in Engineering (MSE)

Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Industrial & Systems Engineering
Mechanical Engineering

Master of Science in Software Engineering (MSSE)

Master of Science in Operations Research (MSOR)

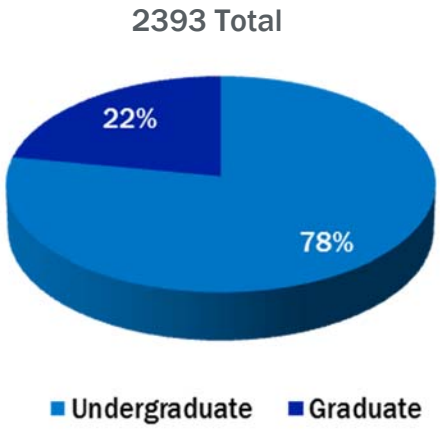
Doctor of Philosophy (PhD)

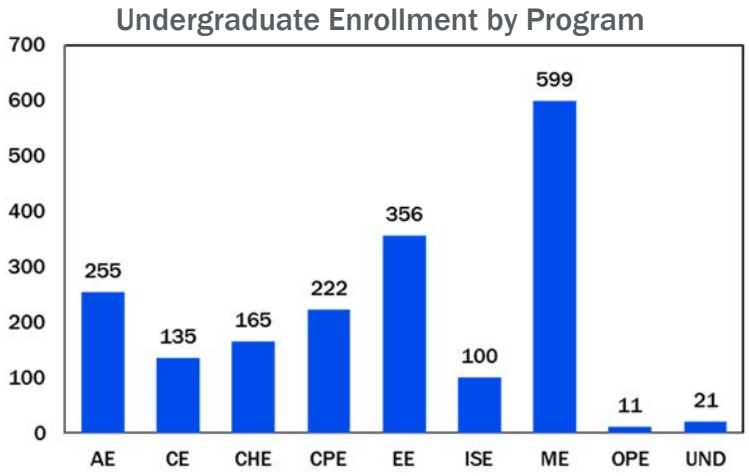
Civil Engineering
Computer Engineering
Electrical Engineering
Industrial & Systems Engineering
Mechanical Engineering

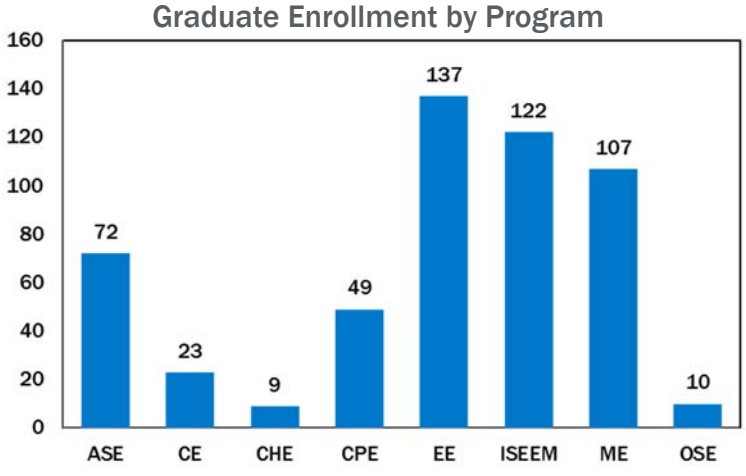
Interdisciplinary Degrees

MS in Cybersecurity
PhD in Biotechnology
MS and PhD in Material Science
MS and PhD in Modeling and Simulation
PhD in Optical Science and

Enrollment Fall 2014

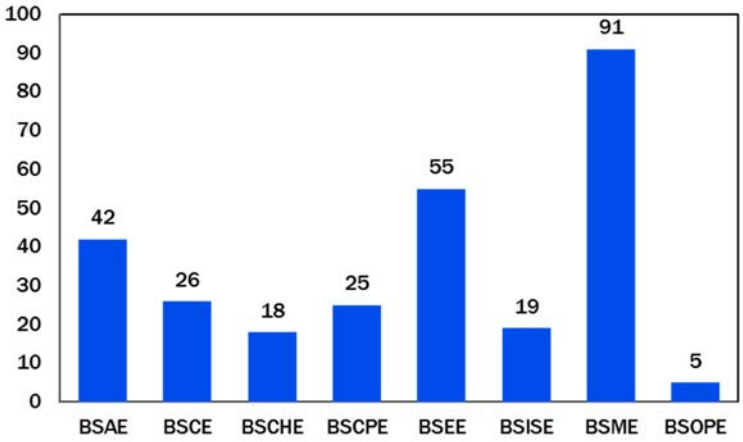




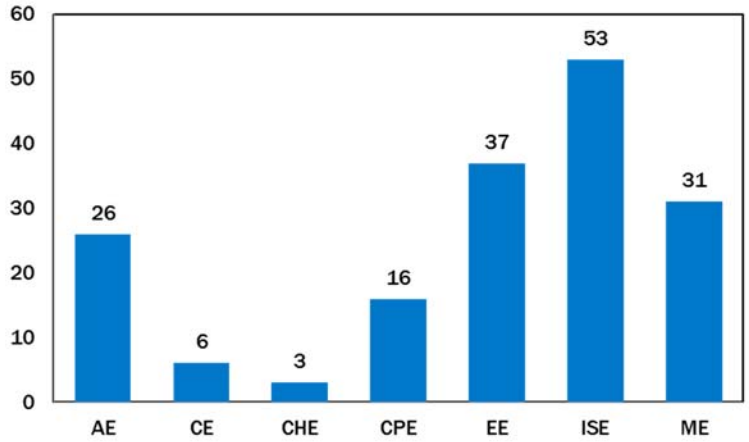


Degrees Awarded 2013-2014

Undergraduate Degrees by Program

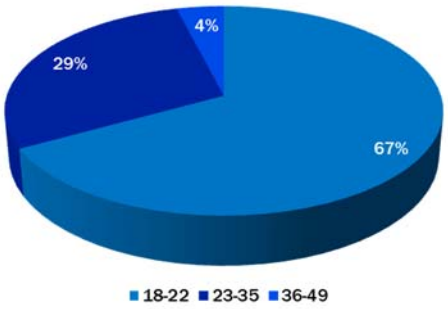


Graudate Degrees by Program

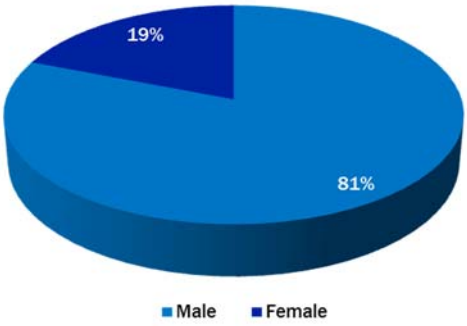


Student Diversity 2013-2014

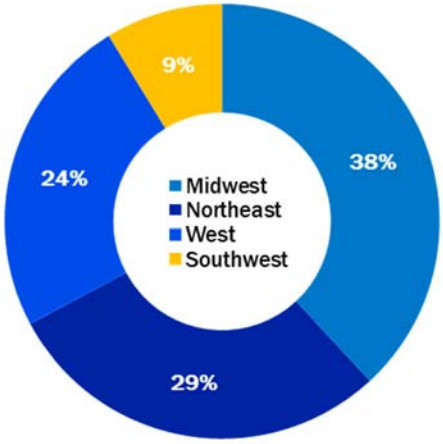
Undergraduate Age



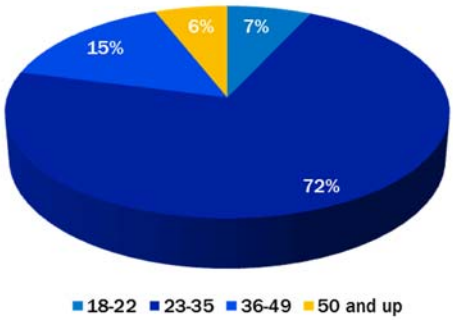
Gender (Total Population)



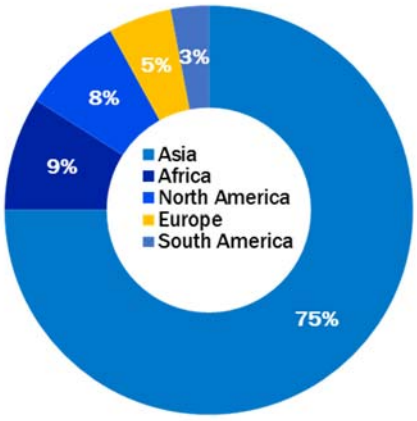
Undergraduate Student Population Outside of Southeast US



Graduate Age



Graduate Student Countries of Origin



College of Engineering Advisory Board

We would like to extend a sincere thank you to each of our EAB members for their service.

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College of Engineering Student Organizations

American Institute of Aeronautics and Astronautics

American Institute of Chemical Engineers

American Society of Civil Engineers

American Society of Mechanical Engineers

Engineers Without Borders

IEEE

Institute of Industrial Engineers

Moonbuggy Club

National Society of Black Engineers

Optical Society of America

Society of Hispanic Professional Engineers

Society of Military Engineers

Society of Women Engineers

Space Hardware Club

Tau Beta Pi

College of Engineering Distance Learning: Spring 2015

The College of Engineering at UAH is growing rapidly, and our graduate degrees at the Masters and PhD level are becoming increasingly available for working professionals needing to further their education through our Online Learning options. The *UAH Distance Learning* program supports courses and programs offered across the Colleges on campus, with a significant number of courses and programs available from the College of Engineering. Below is a list of courses scheduled to be offered via Distance Learning in the Spring 2015 semester. Course and program offerings are growing every semester, and we encourage you to join us through our Online Learning initiatives. For updated information on the schedule, UAH students are encouraged to go to www.uah.edu/cgi-bin/schedule.pl.

If you have a request for a course/program that is not currently offered via distance learning , please email us with that request at coedean.uah.edu. Visit Engineering Distance Leanring at www.uah.edu/eng/departments/engdl.

Spring 2015 Courses

**Classes are taught through videoconferencing*

*CE 422: *Traffic Engineering Design*
MW 12:30pm– 2:30 pm
Dr. Michael Anderson
andersmd@uah.edu

*CE 459/559: *Wind & Seismic Loads*
TR 2:00 pm–3:15 pm
Dr. Nasim Uddin
nuddin@uab.edu

*CE 659: *Water & Wastewater Eng.*
MW 2:00pm– 4:00 pm
Dr. Tingting Wu:
ingting.wu@uah.edu

CPE 631: *Advanced Computational Systems Architecture*
MW 5:30 pm–6:50pm
Dr. Aleksandar Milenkovic
aleksandar.milenkovic@uah.edu

CPE 646: *Mobile & Wireless Networks*
MW 2:20 pm-3:40 pm
Dr. Seong-Moo Yoo:
seong-moo.yoo@uah.edu

CPE 648: *Advanced Computer Networks*
MW 12:45 pm– 2:05 pm
Dr. David Pan
david.pan@uah.edu

CS 652: *Object Oriented Design*
TR TBA
Dr. Harry Delugach:
hary.delugach@uah.edu

EE 630: *Analytical & Comp Methods II*
TR 3:55 pm-5:15 pm
Dr. Chang-Kwon Kang:
Chang-kwon.kang@uah.edu

EM 666: *Engineering Project Mgmt*
R 3:55pm-6:50pm
Dr. Eric Sholes

EM 760: Engineering Management Structures & Systems
T 3:55 pm-6:50 pm
Dr. Dawn Utley:
dawn.utley@uah.edu

ISE 502: Industrial & Org. Psychology
TR 12:45 pm– 2:05 pm
Dr. Gary Huckaby:
gary.huckaby@uah.edu

ISE 639: Nonlinear Optimization
MW 3:55 pm- 5:15 pm
Dr. James Swain:
james.swain@uah.edu

ISE 690: Statistical Methods for Engineers
TR 3:55 pm- 5:15 pm
Dr. Dilcu Helvaci:
dilcu.helvaci@uah.edu

ISE 726 : Systems Modeling
MW 3:55 pm- 5:15 pm
Dr. Jeremy Barnes:
jeremy.barnes@uah.edu

ISE 761: Evolving Theory ofEngineering Management
M 9:35 am– 10:55 am
Dr. Phillip Farrington:
philip.farrington@uah.edu

MAE 520: Compressible Aerodynamics
TR 11:10 am - 12:30 pm
Dr. Jason Cassibry:
jason.cassibry@uah.edu

MAE 568: Elements of Spacecraft Design
TR 8:00 am-9:20am
Dr. Jason Cassibry:
jason.cassibry@uah.edu

MAE 580: Aircraft Stability & Control
MW 5:30 pm-6:50 pm
Dr. Thomas Kelly:
Thomas.kelly@uah.edu

MAE 640: Rocket Propulsion II
MW 9:35 am– 10:55 am
Dr. Robert Frederick:
Robert.frederick@uah.edu

MAE 657: Helicopter Theory
TR 3:55 pm- 5:15 pm
Dr. Gang Wang:
gang.wang@uah.edu

MAE 693: Engineering Analysis II
TR 3:55 pm- 5:15 pm
Dr. Chang-Kwon Kang:
chang-kwon.kang@uah.edu

MAE 695: Aerodynamics I
TR 11:10 am - 12:30 pm
Dr. Chang-Kwon Kang:
chang-kwon.kang@uah.edu

MAE 740: Aerothermodynamics
MW 2:20 pm-3:40 pm
Dr. Kunning Xu:
Gabe.xu@uah.edu

MOD 696: Continuous System Simulation
TR 5:30 pm– 6:50 pm
Dr. Jeffrey Little
jeffrey.little@uah.edu

College of Engineering

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