



Department of INDUSTRIAL & SYSTEMS ENGINEERING AND ENGINEERING MANAGEMENT



ABOUT THE ISEEM PROGRAM

Organizations look to industrial and systems engineers to resolve problems or improve processes where outcomes are influenced by complicated and uncertain interactions between people, machines, information, materials, and energy. In short, industrial and systems engineers endeavor to find ways to do things better. Their concepts may dramatically influence how efficiently, safely, sustainably, and profitably a company achieve its objective.

UAH's Industrial & Systems Engineering and Engineering Management (ISEEM) program is ABET-accredited. Our graduates leave UAH prepared to devise efficient integrated organizational or production systems honed through in-depth instruction incorporating analytical, computational, or experimental practices.

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

Our undergraduate program begins by exposing students to the fundamentals of engineering, as well as the humanities that characterize a university education. The curriculum then shifts to the specialized knowledge of industrial and systems engineering needed for a successful career in industry, the government, or academia. In addition to lab-intensive coursework and team-based projects, students have ample opportunity to see innovations firsthand through local facility tours and internship opportunities

MASTER OF SCIENCE IN ENGINEERING

INDUSTRIAL ENGINEERING

Broadens engineering problem-solving skills: This application-oriented program expands students' understanding of traditional and contemporary problem-solving skills in the areas of operations research, quality control, computer-integrated manufacturing, and simulation.

SYSTEMS ENGINEERING

Expands on systems-oriented aspects of engineering: With a curriculum focused on needs identification, cost-benefit analysis, the system life-cycle concept, quality

RESEARCH AREAS: Additive Manufacturing, Model Based Systems Engineering, Cyber-Physical Systems Integration, Simulation Modeling and Analysis, Complex Engineered Systems, Systems Science, Engineering Material System Design, Supply Chain Management, Lean Manufacturing, Quality Systems Design and Engineering, Large-Scale Complex Systems Design, Gamification and Game Theory, Technology Management

control, logistics planning and control, and forecasting, this program provides students with the analysis and design tools to supplement those learned in their undergraduate engineering program.

ENGINEERING MANAGEMENT

For engineers who find themselves performing engineering management functions without the benefit of a formal management education: This program is designed to build upon the mathematical and analytical expertise gained from both a formal engineering education and professional experience. Its curriculum emphasizes the application of the management function in a technological setting while recognizing the basic and applied sciences in engineering systems.

ENGINEERING MANAGEMENT PROGRAM

What is it? The UAH Engineering Management (EM) Masters Program is a joint program through a partnership between the College of Engineering and the College of Business. It was developed for practicing engineers and other STEM professionals performing technical management who desire formal education in engineering management. An EM concentration of three courses is also available as part of the MBA program through the College of Business.

The program is designed with the working professional in mind. Courses are almost exclusively blended and online.

MASTER OF SCIENCE IN OPERATIONS RESEARCH

Broadens comprehension of the operations research aspects of engineering: Courses in the curriculum for this program include methods of problem identification, linear programming, optimization, queueing, Markov processes, and systems modeling.

PH.D. IN INDUSTRIAL ENGINEERING

The ISEEM Department offers a Ph.D. in industrial engineering with concentrations in industrial engineering, systems engineering, and engineering management. Graduates are well equipped for roles in academia, government, and industry.

INDUSTRY PARTNERSHIPS: NASA, U.S. Army, Northrop Grumman, Alabama Department of Transportation, Steelcase, Lockheed Martin, BOEING, Jacobs, Sanmina/SCI, Adtran, Dynetics, Aerojet Rocketdyne, Davidson Technologies, MITRE





CHAIR'S MESSAGE

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Welcome to another year of scholarship and growth from UAH's ISEEM Department. After much study and planning, we have undertaken a renewed program in Engineering Management in conjunction with UAH's College of Business. It will complement our existing programs in systems engineering, as well as in industrial engineering and operations research. We're now seeking to hire a senior faculty member to lead the program so that we can once more provide this important educational opportunity to engineering and technology graduates employed in local and regional government and commercial organizations.

Our undergraduate program combines engineering fundamentals with an industrial engineering specialization. Our students intern with companies such as Blue Origin, Boeing, and Jacobs Engineering, as well as at UAH's Rotorcraft Systems Engineering & Simulation Center, while our seniors apply their skills to senior design projects in multidisciplinary systems design or in local industry and health-care settings. Our best students take advantage of UAH's Joint Undergraduate Master's Program (JUMP), wherein they are admitted to graduate school prior to graduation and take graduate courses (for dual credit) while completing their undergraduate degree requirements. JUMP makes it possible to get a head start on the "lifelong learning" that is so critical to modern professional careers. With this in mind, we are also designing an option with a systems engineering emphasis for the senior year, which will provide pre-graduate training in this critical area.

ISEEM is home to several on-campus labs where both faculty and students research a diverse array of emerging issues in the industry. The Complex Systems Integration Lab works hand in hand with aerospace and defense agencies to conduct model-based systems engineering research. Dr. Bryan Mesmer's Imagining Engineering Systems Lab examines systems engineering preferences and theories underlying stakeholder-focused engineering in a variety of non-traditional disciplines, including gamification in training, using storytelling to impart complex systems preferences, and the investigation of performance measures of large-scale engineered systems. And the Advanced Manufacturing Lab is working to close knowledge gaps on material and manufacturing process variables involved in this emerging manufacturing technology.

We are proud of the contributions of our faculty and students, a number of whom have received recognition for their conference presentations and research work. This includes Garima Bhatia, who was one of 30 individuals selected to receive Zonta International's Earhart Fellowship. It is both a recognition of her abilities and support for her doctoral work.

Sincerely,

James Swain, Ph.D.
Department Chair, Professor



ImagEnS Lab

The ImagEnS Lab had an exciting year with student accomplishments, new projects, and academic transitions.

Work at the lab has focused primarily on three NASA projects. They include examining congressional value models, preference observation through content analysis, and model-based systems engineering (MSBE) application on the small sat SPoRT.

NASA's objective for the SPoRT project is to transition unique observations and research capabilities to the operational weather community to improve short-term forecasts on a regional scale. Graduate research assistant Garima Bhatia (Ph.D. ISE) spent two weeks in Brazil working on models for the satellite. Bhatia won an Amelia Earhart Fellowship from Zonta International in the spring, a group that empowers

professional women in aerospace and aeronautics.

The spring also saw the start of a new NASA-funded project: the Marsbee project is exploring the feasibility of a robotic bumblebee-sized flapping-wing flyer whose large cicada-like wings have the ability to generate sufficient lift to hover in the Martian atmosphere. Giulia Palma, a graduate ISE student, is developing a digital representation to improve design and systems engineering.

Bhatia and Palma attended two-week NSF-sponsored Engineering and Systems Design Research Methods workshop at Clemson University in South Carolina. The scholarship-funded "summer school" explored case study, protocol analysis, and designer experiments.

Christopher White (Ph.D. ISE) joined the lab last spring. His research focuses on uncertainty in engineering decisions. Meanwhile, GRA Joseph Clerkin earned his Master's with a thesis titled "The Development of Incentive Structure Games for Systems Engineering Training using Multidisciplinary Principles." Clerkin remains at the ImagEnS lab while now pursuing his Ph.D.

In October 2017, ImagEnS faculty and students orchestrated and presented at the ASEM International Annual Conference. Approximately 217 people attended the four-day event in Huntsville. The following month, students Bhatia, Palma, and Clerkin won scholarships for their presentations at the Society of Reliability Engineers RAM Training Summit X.



COMPLEX SYSTEMS INTEGRATION LAB (CSIL)

The CSIL (Complex Systems Integration Laboratory) is hopping. The team is currently comprised of six graduate students: Alex Aueron, Adam Bower, Garrick Jennings, Justin Conner, Victor Lopez, and Jalyn Garipey, and two undergraduate students: Sharon Balogun, Alay Shah.

The CSIL research team is currently supporting three funded NASA research contracts: Nuclear Thermal Propulsion, Space Launch Systems Core Stage Engine Affordability, and Lynx X-ray Observatory. All three projects require development of novel systems engineering tools and methods, and the CSIL research team is utilizing the Systems Modeling Language (SysML) integrated with other analytical tools and methods to achieve the research goals.

We saw two students graduate during the spring commencement – Alex Aueron received his M.S. in Aerospace Systems Engineering after successfully defending his thesis entitled “Analytical Modeling of Radiation Attenuation and Heat Deposition in Propellant for Nuclear Thermal Rockets,” and Jalyn Garipey received her B.S. in Industrial & Systems Engineering. Both will be continuing their graduate studies this fall following summer internships at Aerojet Rocketdyne.

Other student summer internships include: Adam Bower at Blue Origin, Justin Conner at Boeing, Garrick Jennings at Jacobs Engineering, and Victor Lopez at the UAH Rotorcraft Systems Engineering and Simulation Center. The year also saw two graduate students employed by the UAH Rotorcraft Systems Engineering and Simulation Center (Zach Thomas and Marc Gethers) while they continue their graduate studies toward MS degrees in Systems Engineering.

Over the past year the CSIL research team presented research results at various scientific and technical conferences including: AIAA Propulsion & Energy Forum, INCOSE International Symposium, Joint Army Navy NASA Air Force (JANNAF) Joint Propulsion Subcommittee Meeting, Conference on Systems Engineering Research (CSER), Nuclear and Emerging Technologies for Space, AIAA SciTech, and the International Annual Conference of the American Society for Engineering Management.



UAH ENGINEERING FORUM

The College of Engineering at UAH hosted the first UAH Engineering Forum (UAH-EF), held in conjunction with the 2018 Southeast Symposium on Contemporary Engineering Topics (SSCET). The event took place on Friday, Aug. 3 at UAH Charger Union Theatre and the Shelby Center for Science & Technology.

"The UAH Engineering Forum is an opportunity for engineers, students, and faculty from UAH and universities in the Southeast to network and discuss solutions to modern engineering problems," says Dr. Tommy Morris, UAH-EF chair and director of UAH's Center for Cybersecurity Research and Education. An additional benefit to hosting the forum at UAH, says Dr. Morris, is the opportunity to show off "our campus, our students, and many of our new faculty."

The UAH-EF featured presentations from technical experts and faculty from companies and universities across the Southeast, including UAH's College of Engineering. Its purpose was to explore and discuss state-of-the-art engineering solutions to modern engineering problems. The event kicked off on Thursday, Aug. 2, with an evening reception and dinner for speakers and patrons at the U.S. Space & Rocket Center.

Topics covered during the track sessions included ; industrial and systems engineering; aerospace; biomedical and biotechnology; chemical and petroleum engineering; civil, environmental, and coastal engineering; cybersecurity; electric power; electrical and computer engineering; ethics and engineering education; mechanical engineering; and student research.

ISEEM presenters included:

- ▶ Dr. L. Dale Thomas, "Systems Engineering Implications of the Digital Twin"
- ▶ Dr. Bryan Mesmer, "A Reimagining of Systems Engineering through Adoption of Art Method"
- ▶ Garima Bhatia, "Preliminary Analysis of Value Contributed by Systems Engineers to Organizations"
- ▶ Giulia Palma, "Content Analysis of NASA's NextStep 2 Project to Elicit Preferences"
- ▶ Victor Lopez, "Complexity estimation using SysML"
- ▶ Christopher White, "Examining Engineered System Through Holistic Value vs. Performance Metric Lenses: An Application to Launch Vehicle Design"
- ▶ Joseph Clerkin, "A Comprehensive NASA Projects Value Model: Describing Value Contributions from Knowledge"



ISEEM Student Receives Prestigious Fellowship

Garima Bhatia, an ISEEM graduate research assistant and Ph.D. student, is one of 30 recipients of Zonta International's Amelia Earhart Fellowship for women pursuing doctoral degrees in aerospace-related sciences or engineering. Under academic advisement from Dr. Bryan Mesmer, Bhatia's research is centered on representing value models in SysML, a model-based systems engineering language, in order to improve decision-making in system design.

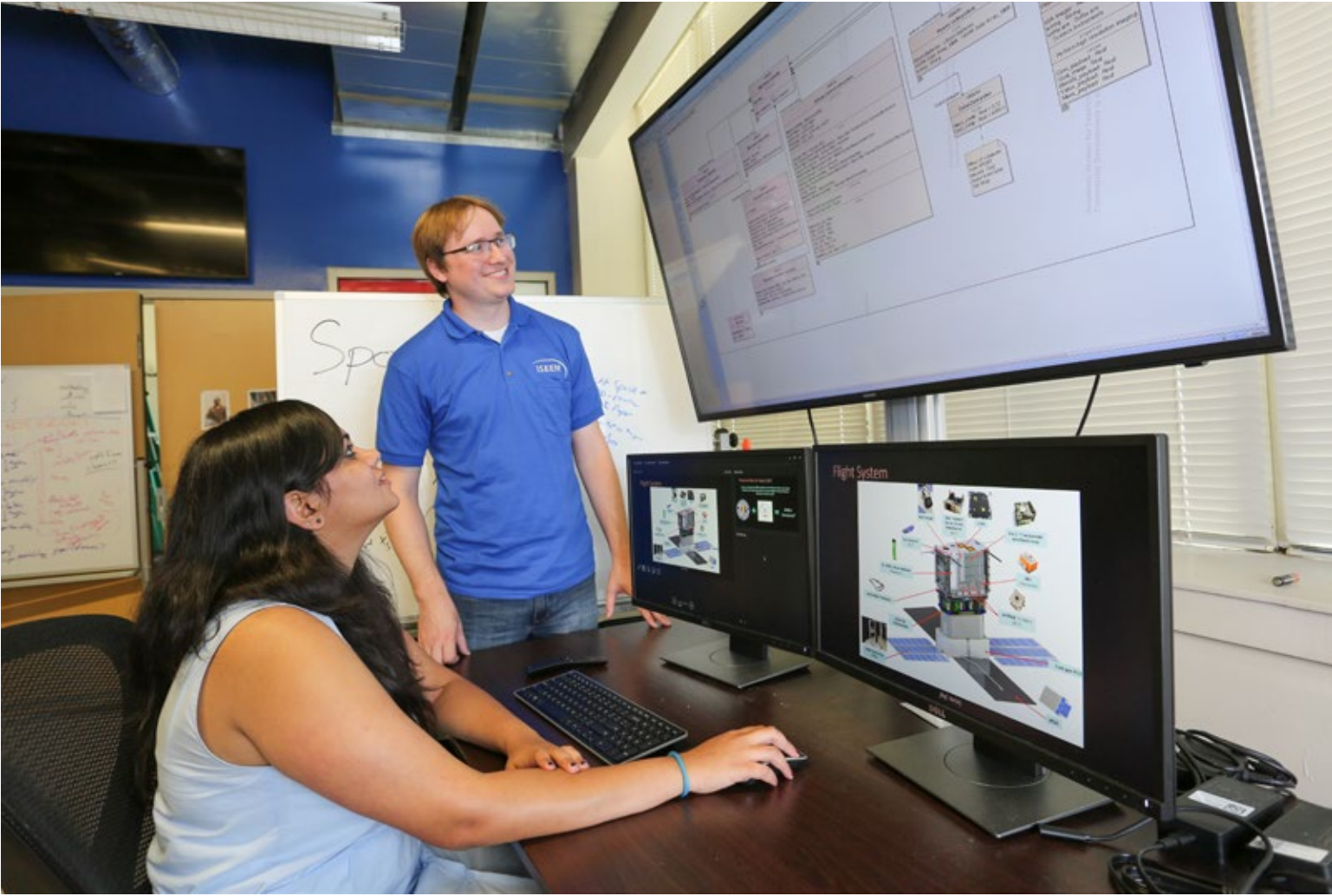
Much of her research takes place in Dr. Mesmer's ImagEnS lab where she is part of a collaborative research

effort—namely, the SPoRT project with NASA and Brazil's Instituto Tecnológico de Aeronáutica and Instituto Nacional de Pesquisas Espaciais. Together, the group is developing a small satellite to study ionospheric scintillation, a phenomenon that can negatively impact transmission of communication and navigation signals. Last fall, Bhatia traveled to Brazil to share her modeling expertise, introduce model based systems engineering approaches, and gather additional data for integration into the model. Sometime early next year the satellite will go to Brazil for integration and testing prior to its launch by NASA in 2020. In the

meantime, Dr. Mesmer and Bhatia will do some simulations to see how the satellite behaves, check out its systems, and gauge how it responds to signals while in orbit.

Bhatia has dreamed of being part of a NASA mission since reading a biography of Indian-American astronaut Kalpana Chawla as a middle school student. "Aerospace has always been my passion," she says. "Working on this project, especially for an international student, is really exciting."

Bhatia attained her Bachelor of Technology in Aerospace Engineering



from Indira Gandhi National Open University in 2014. She earned her Master's at Iowa State in 2016, and joined UAH later that year to begin her Ph.D. in Industrial & Systems Engineering.

In addition to her collaborative research, writing, and travel to industry conferences, Bhatia is, of course, immersed in the daunting research involved in her dissertation. She's looking at the roles of systems engineers in the systems engineering life cycle. "By developing axioms that characterize the role based on project scope and organization size, the systems engineering role may bring more value to an organization and project," says Bhatia.

Bhatia acknowledges that sometimes the literary reviews and data collection required for such an intense project can become tedious. But, she says, the Amelia Earhart Fellowship "reignited my motivation because it reminds me that I can do it and it is valuable."

"Aerospace has always been my passion," she says. "Working on this project, especially for an international student, is really exciting."

A photograph showing two men in a laboratory setting. The man on the left, Dr. Chang-kwon Kang, is wearing a light blue button-down shirt and glasses, looking down at a large sheet of paper. The man on the right, wearing a blue and white checkered shirt and glasses, is also looking at the paper. In the background, another person is partially visible. The large sheet of paper they are looking at contains a detailed diagram of a robot, likely the Marsbee, with various colored lines and text. The title 'Marsbees' is overlaid on the left side of the image in a large, white, sans-serif font.

Marsbees

UAH PROFESSOR'S EARLY-STAGE PROPOSAL FOR "MARSBEES" SELECTED TO RECEIVE NASA FUNDING

A proposal on Marsbees submitted by Dr. Chang-kwon Kang, an assistant professor of mechanical and aerospace engineering at UAH, was one of only 25 selected to receive a 2018 NASA Innovative Advanced Concepts (NIAC) award. Dr. Kang's collaborators on the proposal include Drs. Farbod Fahimi, Brian Landrum, and Guangsheng Zhang from UAH's Department of Mechanical & Aerospace Engineering; Dr. Bryan Mesmer from UAH's Department of Industrial & Systems Engineering and Engineering Management; Dr. Rob Griffin from UAH's Department of Atmospheric Science; Dr. Taeyoung Lee from George Washington University's School of Engineering & Applied Science; and Dr. Aono Hikaru from the Tokyo University of Science.

"We are very excited about this opportunity," says Dr. Kang. "Flying on Mars is challenging because of the ultra-low density in the Martian atmosphere. Our preliminary work shows that bioinspired aerodynamic mechanisms can help in generating sufficient lift to fly on Mars."

The NIAC program, which invests in early-stage technology with the potential to revolutionize future space exploration, provides up to \$125,000 in funding over nine months to awardees; those whose concepts successfully undergo feasibility testing are then eligible to apply for Phase II awards.

"The NIAC program gives NASA the opportunity to explore visionary ideas that could transform future NASA missions by creating radically better or entirely new concepts while engaging America's innovators and entrepreneurs as partners in the journey," says Jim Reuter, acting associate administrator of NASA's Space Technology Mission Directorate. "The concepts can then be evaluated for potential inclusion into our early-stage technology portfolio."

Dr. Kang's proposal, entitled "Marsbee – Swarm of Flapping Wing Flyers for Enhanced Mars Exploration," seeks to increase the set of possible exploration and science missions on Mars by investigating the feasibility of flapping-wing aerospace architectures in a Martian environment. At its center is the

Marsbee, a robotic bumble-bee-sized flapping-wing flyer whose large cicada-like wings have the ability to generate sufficient lift to hover in the Martian atmosphere. Integrated with sensors and wireless communication devices, these flyers would work in a swarm, with a mobile base serving as their recharging station and a main communication center.

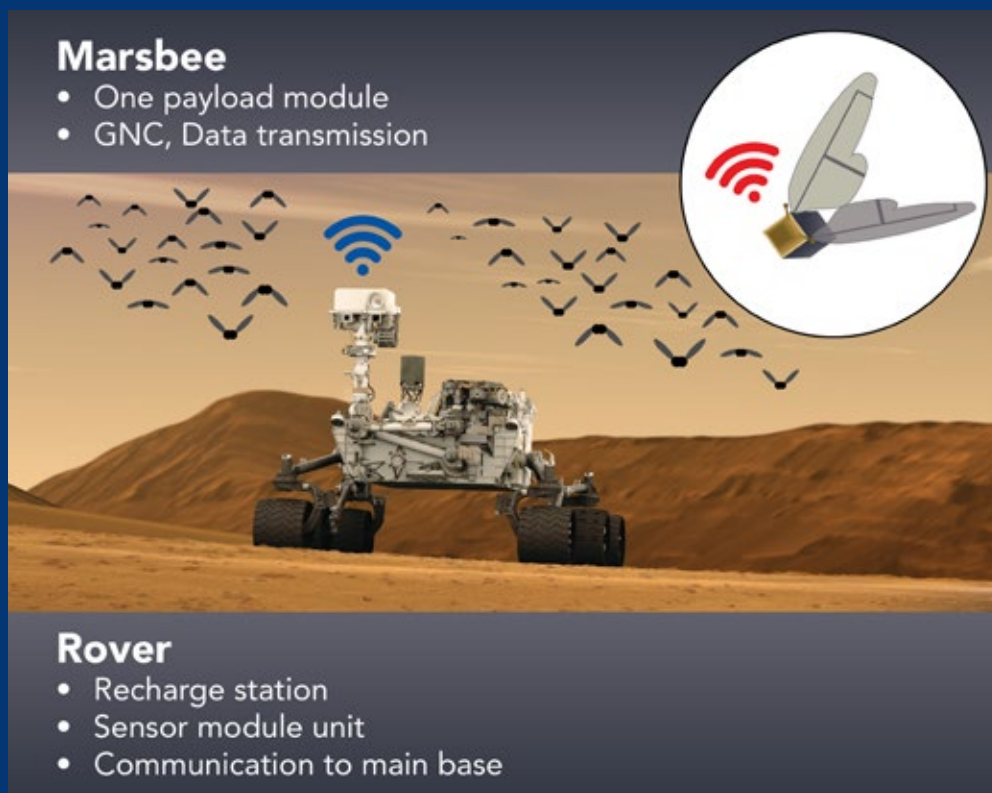
Ultimately, the hope is that the Marsbees will be able to provide point measurements of the pressure, temperature, or chemical composition of the planet. "They could also aid in collaborative terrain mapping," says Dr. Landrum, who is an associate professor and the associate chair of UAH's Department of Mechanical & Aerospace Engineering. "And, of course, their capabilities would expand as miniaturized sensor technologies and more efficient batteries become available."

At present, however, the objective is more modest. "With this Phase I award, we want to determine the wing design, motion, and weight that can hover with optimal power in Mars' atmospheric conditions and to assess the hummingbird micro-air vehicle – one of only a few robotic flappers in the world that can fly on Earth – in Mars conditions," says Dr. Kang. "Our UAH colleagues will numerically model, analyze, and optimize a flapping flyer for Martian atmospheric conditions, while our

Japanese colleagues will develop and test a micro-flapping robot that is uniquely designed and constructed for the low-density atmosphere on Mars."

Should the team go on to receive a Phase II award, the goal will be to build on this research by addressing the maneuverability, wind gust rejection, takeoff/landing, power implications, remote sensing, and mission optimization of the Marsbees. But for now, says Dr. Kang, the focus is on the initial task of proving the feasibility of the Marsbee concept over the next nine months.

"One of our main goals for the first phase is to experimentally demonstrate that these Marsbees can lift off their own weight in Martian density conditions in the vacuum chamber of UAH's Propulsion Research Center," he says. "Our long-term overarching goal is to develop swarms of Marsbees that can help with the human exploration on Mars."





UAH AND JACOBS ENGINEERING ANNOUNCE NEW GRADUATE FELLOWSHIP PROGRAM

UAH and JACOBS Engineering recently established a new education partnership, designed to offer graduate students financial support and the opportunity to work with company engineers on pioneering research projects.

"The JACOBS Systems Engineering Fellows Program (JSEFP) at UAH will offer graduate students the opportunity to advance their education, gain practical experience in their technical fields, and serve the national interest by developing new technologies and solutions to problems of interest," said Dr. L. Dale Thomas, Director, Alabama Space Grant Consortium and Professor and Eminent Scholar in Systems Engineering.

Garrick Jennings is the first recipient of the JSEFP/UAH Graduate Fellowship. An Aerospace Systems Engineering major Jennings works with Thomas

as a Graduate Research Assistant on Nuclear Thermal Propulsion (NTP) projects.

Jennings will be working to support the JACOBS Space Exploration Group (JSEG) contract at Marshall Space Flight Center (MSFC).

"JACOBS has been very diligent in working with UAH and with Garrick to identify projects that will provide background and relevant work experiences for his masters thesis research, which will be in systems engineering for space transportation vehicles powered by Nuclear Thermal Propulsion," said Thomas.

Jennings is "excited and nervous" about being the first JSEFP/UAH graduate fellow. "My performance will set the tone for future JSEFP/UAH fellows, and my feedback will help shape the program. I have already

experienced a lot of support from JACOBS and have been working on Redstone for a few weeks. I am supporting the System Integration Laboratory which has a running hardware-in-the-loop configuration of the Space Launch System (SLS)."

Thomas said JACOBS' strong academic support of UAH will allow the College of Engineering to recruit and retain talented students who will, in turn, solve challenging problems in collaboration with the international technical services firm.

"This program is one collaborative vehicle to help JACOBS meet their workforce needs and help UAH conduct research relevant to the needs of MSFC and JACOBS," Thomas said.

UAH's new long-term partnership with JACOBS is the best of both worlds for the university and the tech company.

"With the continuous need for a well-educated and highly trained aerospace workforce, it is critical that academia and industry partner when possible to ensure we are ready to meet the needs of Jacob's customers, including NASA/MSFC," said Dr. Lisa Monaco ('90 MS Chemistry, '94 PhD Materials Science), CED Manager, JSEG.

"To maintain our nation's position as a global leader in space, we must motivate our students to go into the Aerospace field and other STEM (Science, Technology, Engineering, Mathematics) related areas," said Monaco. "In 1987, UAH and NASA offered a graduate fellowship program and I was fortunate enough to have been selected. I performed ground-based research for some early microgravity experiments being conducted on various Shuttle flights. It was through this program that I was able to complete both my MS (Chemistry) and PhD (Materials Science) at UAH. The entirety of my career has revolved around supporting the space program. It has truly been an honor and privilege to work on such an exciting mission, and with outstanding people," added Monaco.

"Supporting graduate education through assistantships help both the company and the student. First by having a student and faculty member work with a company on a practical issue and second by having the student gain experience. Additionally the student is able to receive funding to help offset the cost of their education," said Dr. David Berkowitz, UAH Dean of the Graduate School and International Services.

"JACOBS will concur in Garrick's thesis research topic, and Dr. Monaco has agreed to serve on his thesis committee," said Thomas.

Jennings' research includes completing trajectory analysis for potential science missions using NTP technology or calculating gravity loads on the rocket operating at full power for Cryogenic Fluid Management analysis purposes.


"Most of our workforce supporting NASA's MSFC is working on NASA's SLS, so Garrick will have ample opportunity to be part of this generation's program that will send us to the Moon and Mars with the most powerful rocket ever launched," said Monaco. "Because his focus is Systems Engineering, he will rotate around our departments where this skill is utilized, thereby getting a unique opportunity to learn about multiple disciplines and with a system level perspective," Monaco added.

"One of UAH's strategic advantages is proximity to the Redstone Arsenal and Cummings Research Park," said Thomas. "We must engage with them to exploit that

strategic advantage for the military base and industrial park in ways that further UAH training and research mission," Thomas added.

JSEFP/UAH Fellows serve as Graduate Research Assistants (GRA) during the academic year at UAH, and JACOBS reimburses the university for their tuition, fees, with a stipend. Additionally, during the summer, JACOBS provides internships for the JSEFP/UAH Fellows. Applicants must be U.S. Citizens, and must be pursuing a graduate STEM degree at UAH in the field of systems engineering.

Jennings' JSEFP/UAH award ends in 2020, when a new graduate student will be selected to participate in the program.



SLS is an advanced launch vehicle that provides the foundation for human exploration beyond Earth's orbit. With its unprecedented power and capabilities, SLS is the only rocket that can send Orion, astronauts and large cargo to the Moon on a single mission. (Credit: NASA)

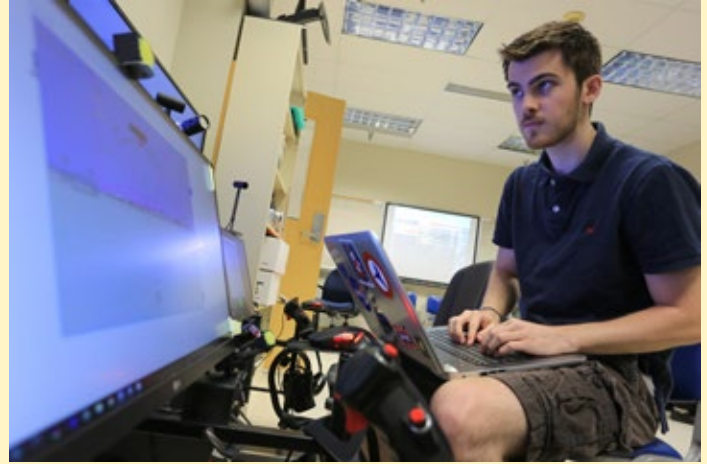
Derek Millard

Undergraduate Derek Millard works with the Army Research Lab at Tech Hall. The Degraded Visual Environment Mitigation program is developing virtual environments and cues from sensor data to aid helicopter pilots during takeoff, landing, and flying when visuals are compromised. Derek is developing and optimizing color gradients through the use of perceptually uniform color spaces, which will be used to represent information such as height above sea level in a virtual environment.

Currently a senior, Derek received the Vertical Flight Foundation Scholarship his sophomore year for his work with helicopter simulators at the Rotorcraft Systems Engineering and Simulation Center on campus. He has also applied his ISE coursework to research with nurse schedule optimization.

"When I toured UAH, I fell in love with the research that the ISEEM department had to offer. I have pursued that passion since my freshman year and now I'm working in the lab where I was introduced to the program itself. I have a career path in development where I can do what I enjoy."

Derek currently serves as the President of the UAH Lancers, the official student ambassadors and public relations



representatives of the University. "Under this organization, I had the honor of being a sighted guide for a blind student during spring commencement. I made sure that she was able to walk across the stage and receive her degree during the ceremony. I'll never forget the experience that I got to share with her."

Derek is on track to graduate with a Bachelor of Science in Industrial & Systems Engineering in spring of 2018.

Marc Gethers

Marc Gethers received a Bachelor of Science in Industrial and Systems Engineering from UAH in 2017 and is currently working on his Masters in Systems Engineering. He works as a research associate on the topic of Model Based Systems Engineering on a Boeing Defense, Space, & Security program as well as a NASA X-Ray Telescope called Lynx, a proposed successor to Chandra. More specifically, he is collecting data for the development of a new technique in systems engineering known as Goal-Function Tree Modeling for Systems Engineering and Fault Management. The Goal Function Tree manages mission systems using nominal and off nominal goals to determine mission status.

Crediting professor Dr. Dale Thomas and research scientist Jonathan Patrick, he says "they taught me the ins and outs of MBSE, which is essential to my current job at the Rotorcraft Systems Engineering and Simulation Center."



Gethers' research findings were presented at two recent systems engineering conferences.

Joseph Clerkin

Joseph Clerkin is a systems engineering Ph.D. candidate and graduate research assistant. He has been part of the ImagEnS lab team since the summer of 2015. Under advisement of Dr. Bryan Mesmer, Joseph analyzed NASA projects to understanding how value is derived as part of a larger NASA Value Modeling project. Joseph also works in the Rotorcraft Systems Engineering and Simulation Center (RSESC). His primary duties include: Model Based Systems Engineering (MBSE) and other systems engineering, modeling tasks

Joseph's areas of interest include mechanism design, games, human factors, and developing methods from other specialties/topic areas in systems engineering. He earned his MSE in Systems Engineering from UAH in May 2018 and continues the PhD program. His dissertation is "mostly concerned with asking questions related to how systems engineering methods get adopted by different organizations." He graduated with a Bachelor of Arts in English from Indiana University in 2008.



Alexander Aueron

Alexander Aueron is a systems engineering Ph.D. candidate graduate research assistant at ISEEM's Complex Systems Integration Laboratory (CSIL) investigating the benefits of applying the model-based systems engineering approach to modeling spaceflight missions. The current focus is developing a SysML model for a deep space mission—a round trip flight between Earth and Mars using nuclear thermal propulsion (NTP). Model-based systems engineering is being evaluated for what advantages it has over other system engineering methods in multiple industries. He is engaged in SysML model construction for the spacecraft with an emphasis on thermal modeling of the propellant tanks.

He received his dual Bachelors—Mechanical Engineering and Aerospace Engineering—at The University of Florida.





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