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- Geotechnical Engineering
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- Structural Mechanics

The Ph.D. program, which is offered jointly with the University of Alabama in Birmingham, includes six credit hours at the partner institution. Students can choose from a variety of specializations, from space-based construction to geoenvironmental engineering.

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Already working full time as an engineer? Then our professional master’s degree is for you! The program consists of 30 hours of coursework across three areas: transportation, structural, and environmental. Even better? Most of the courses can be accessed online, which means you won’t have to put your career on hold to get ahead!
The year 2020 was filled with challenges, frustrations, sadness and every other emotion you can imagine. Our daily lives were altered in a way that may never return to what was considered “normal” in 2019. For all those directly impacted, through personal illness or loss of a loved one, I send the sympathies of the Civil Engineering Department.

In the UAH Civil Engineering world, 2020 meant remote learning and zoom meetings as we tried to make the best use of technology to overcome the social limitations. As civil engineers, we tried our best to say, “this is the situation, let’s find a solution.” I would like to express my thanks to our faculty, staff and students who worked extra to figure out solutions and had patience and understanding when solutions didn’t go exactly as planned.

Necessity leads to innovation and adversity leads to ideas. The year 2020 was certainly a reflection of that statement.

Please continue to stay safe and be smart as we look forward to returning to the buildings and classrooms in Fall 2021!

Sincerely,

Dr. Michael Anderson
Department Chair
Civil & Environmental Engineering Department
The American Society of Civil Engineers UAH Chapter

The American Society of Civil Engineers is a student organization that, through hands-on activities, teaches students concepts related to the field of civil engineering. Each year UAH’s ASCE competes in the Southeastern Conference, in which schools from all over the southeast come together and compete in a variety of competitions all pertaining to engineering. However, this past conference was cut short due to COVID-19.

Teams arrived on the first day of the conference excited and ready to compete. Sadly by the end of that first day the conference was canceled and all the teams were sent home. Due to COVID-19 this year’s conference will be on a much smaller scale than normal.

In order to keep the spirit of conference alive, the UAH ASCE is planning to host a Civil Day. This event will be open to all students attending UAH. For Civil Day the club plans to work through the semester to prepare designs for competitions that students can take part in. The club is very excited to get to work and is looking forward to a successful Civil Day.

- Connor Moore, ASCE Chapter President

The American Society of Civil Engineers Message from the president:
COVID-19 Wasn’t Civil To The Civils

Southeast Regional Competition in Orlando, FL | UAH’s ASCE team at the 2020 Southeastern Conference in Nashville, TN.
The Office for Public Transportation

The Office for Public Transportation is a partnership among The University of Alabama in Huntsville, the Alabama Department of Transportation (ALDOT), and the Federal Transit Administration (FTA). Our office reports to the Alabama State Local Transportation Engineer and the Local Transportation Bureau to ensure that our local partner transportation providers are in compliance with all ALDOT and FTA regulations.

Our Services

We provide the following services to public transportation providers:

- Helping create federally compliant public transportation agencies
- Overseeing invoicing and spending
- Vehicle maintenance activities
- Passenger policies and procedures
- Driver rules and regulations
- Route mapping
- Driver training in the following areas:
  - Passenger conduct
  - Vehicle inspections
  - Vehicle maintenance

How We Work

The Office of Public Transportation consists of a director, a financial manager and three regional managers. We work with rural providers of public transportation and providers of transportation specifically designated for elderly and disabled passengers. The state has approximately 30 rural transit agencies and 150 agencies transporting the elderly and disabled.
The RCIS lab at UAH was established by Dr. Abdullahi Salman in 2018 with the goal of developing methods to reduce the magnitude and duration of disruptions caused by natural hazards to civil infrastructure systems and communities. Our current research focus includes natural hazards modeling (e.g., hurricanes, earthquakes, tornadoes, flooding, ice storms, tsunamis, etc.), infrastructure resilience (electric power systems, transportation systems, water and wastewater systems, gas networks, etc.), community resilience, and climate change adaptation. Some of our ongoing projects are described below.

**Natural Hazards Modeling**

Of the many natural hazards threatening the U.S., hurricanes are among the costliest and most lethal. The main hazards caused by hurricanes are high-speed winds, storm surge, and heavy rainfall. An average of 11 tropical storms are formed annually in the Atlantic basin, 6 of which have the potential of turning into hurricanes. Meanwhile, because of climate change, we are experiencing a higher rate of more intense hurricanes (Figure 1). In 2020 alone, 11 named hurricanes hit the U.S. shore, 5 of which hit the Louisiana shores in the Gulf of Mexico. The most recent is Hurricane Zeta (Figure 2), a category 2 hurricane with maximum sustained winds of 100 miles per hour.

Babak Salarieh, a Ph.D. student at the RCIS lab, is currently developing a computationally efficient method for simulating hurricanes and modeling storm surges for the Gulf of Mexico for coastal protection planning. The objectives of the research include (i) developing a computationally efficient hurricane-simulation model for the Gulf of Mexico; (ii) developing a method for selecting a reduced set of hurricanes to represent the hurricane risk in the region adequately; (iii) using the reduced set of hurricanes to spatially characterize the storm-surge hazard in the Gulf Coast using the SWAN+ADCIRC model, (iv) validating the developed hurricane simulation and storm-surge model using historical hurricane data compiled by NOAA, USACE, USGS, and FEMA, and (v) developing an online interactive tool for use by researchers and government agencies in the Gulf Coast.

The developed model and tool can be used to quantify the risk posed by hurricanes to various locations along the coast, assess the effectiveness of existing protection measures, plan new protection measures, improve emergency preparedness, and increase awareness of hurricane risk among coastal populations.

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Figure 1: Number of recorded hurricanes per year between 1851 - 2020 (Data source: NOAA)
Civil Infrastructure Systems Resilience

The safety, security, prosperity, and social well-being of communities depend on the resilience of civil infrastructure systems such as transportation networks, power grid, water and wastewater systems, and gas supply systems. Disruptions to civil infrastructure can compromise the activities of security agencies, jeopardize public health, and disrupt economic activities. RCIS lab aims to develop methods for risk management and resilience improvement for civil infrastructure systems.

Eric Merschman, a Ph.D. student at the RCIS lab, is developing a framework for road network resilience. The project’s specific objectives include developing a multi-dimensional criterion to evaluate the performance of roadway networks, incorporating social vulnerability into pre-disaster risk mitigation and post-disaster response planning, and developing efficient resource allocation models based on long-term cost-benefit analysis. One of the key factors being considered is how access to public transportation by socially vulnerable populations may be affected by long-term disruption to road networks. Census data on demographics, household income, and access to municipal public transportation systems (WAVE Transit in Mobile, AL, and the BRATS bus system in Baldwin County, AL) is being used in the project. The project is in collaboration with Dr. Michael Anderson, Professor and Chair of the CEE Department, and Dr. Mehrnaz Doustmohammadi, a Research Scientist in the CEE Department.

Izuchukwu Ugwu, a master’s student at the RCIS lab, is developing a framework for post-disaster recovery planning for interdependent infrastructure systems. The objective is to ensure the rapid recovery of service delivery to critical facilities such as hospitals, evacuation centers, fire stations, and police stations. Infrastructure systems being considered are water distribution systems, road networks, and the power grid. Specific objectives include modeling the interdependence between infrastructure systems using multi-layered complex network theory, developing functionality metrics for critical facilities that relate the delivery of service by various infrastructure systems to the functionality of the critical facilities, and developing a post-disaster recovery framework that will lead to faster recovery of critical facilities. The project will provide a new approach to recovery planning that prioritize the recovery of facilities that are critical to the health and well-being of communities after a disaster.
Mr. Kimbrough is a Giles County, TN native graduating from Giles County High School in 1999. He worked with a highway contractor out of Nashville, TN while attending The University of Alabama in Huntsville, earning a Bachelor of Science in Civil Engineering in 2003.

After graduation, Jack joined the Huntsville, AL office of Barge Design Solution, Inc. (fka Barge Waggoner Sumner and Cannon, Inc.) as a Resident Project Representative on general aviation airport projects. During his 17 years at Barge, he has worked on transportation related projects throughout the Southeast and for multiple DOT’s and municipal clients. Jack now serves as the Manager of Transportation Services for the firm’s Alabama operations and is the Huntsville Office Leader.

Jack has served as the Vice President and President of the Local Huntsville Chapter of the American Society of Civil Engineers and as a Board Member and Secretary / Treasurer of the Alabama Section.

Jack has been married to his wife Deborah for 17 years and they have two children, Annabelle and Owen.
Niloufar earned her bachelor’s degree in environmental studies at the Isfahan University of Technology, Iran, and she completed her masters in environmental planning and management at the University of Tehran, Iran. During her master’s program, she worked on several environmental projects such as health risk assessment, urban planning projects, environmental impact assessment etc. For her master’s thesis Niloufar studied the formation of urban heat islands which are the result of human activities.

Her interest in studying environmental issues and human-environmental interaction encouraged her to pursue her Ph.D. studies in transportation engineering. Niloufar works as a graduate research assistant/graduate teaching assistant with Dr. Michael Anderson. She is currently working on some statistical modeling techniques to analyze the impact of socio-demographic, built environment and traffic characteristics on crash patterns.

Wenwen was born in Qiqihaer in the Heilongjiang province of China. She received her bachelor’s degree in macromolecule and material engineering from the East China Jiaotong University in 2010. From 2010 to 2015, Wenwen worked at the Institute of Chemistry, Chinese Academy of Sciences (ICCAS). Her research at the ICCAS was on the mixed-valence system (including transition-metal compounds and coordination metallopolymers), which bridges the traditional fields of organic and inorganic chemistry.

Wenwen earned a master’s degree in environmental engineering from The University of Alabama in Huntsville (Huntsville, AL, UAS). With Dr. Wu as her advisor, Wenwen’s Ph.D. research focused on advanced heterogeneous catalytic ozonation for water treatment and reuse.
CONGRATULATIONS
to Our Ph.D. Graduates cont.

Naveen earned his bachelor’s degree in civil engineering from SRM University, Chennai, India in 2015. He obtained his master’s in Civil and Environmental Engineering from UAH in 2017 while focusing on transportation engineering.

Naveen worked as a graduate research assistant and teaching assistant under Dr. Anderson while pursuing his master’s at UAH. His master’s topic dealt with a matched case-control logistic regression approach for macroscopic crash prediction on Interstate-65 in Alabama. During his bachelor’s study in India, he decided to learn and research further in transportation engineering while setting up his real goal to pursue a Ph.D. degree. The Ph.D. dream became further formulated after completing his master’s degree at UAH with Dr. Haleem on developing bicycle-vehicle specific safety performance functions (SPFs) on Alabama’s urban and rural roadways as part of a study sponsored by the Alabama Department of Transportation (ALDOT).

“…One of my driving forces for pursuing Ph.D. in transportation was to reduce crash fatalities on roadways. I was able to accomplish this goal by finding out the factors causing these crashes by analyzing the data. From my experience from bicycle safety study, I extended my research to reduce crashes in weaving sections on highways. Under guidance from Dr. Michael Anderson, I worked independently on this project and defended my dissertation on “Analysis of Crashes on Weaving Sections using Different Methodological Approaches”.

UAH is like a family for me and they have supported me financially for my education, research and attending Transportation Engineering Conferences in Washington, D.C. I would like to extend my regards to professors, staff and colleagues at the Civil and Environmental Engineering Department for their support and guidance.

In my future endeavors, I want to join a private or government engineering organization where I can contribute my skills for roadway projects to improve infrastructure and safety in the United States.

I would suggest future students in civil engineering, to start thinking about their goals, about what they want in life and what they want to be in the early stages of bachelor’s degree. In addition, I would suggest my future peers, to acquire good team building and communication skills.”
Izuchukwu Albert Ugwu joins UAH from Nigeria. He is currently an MSE student in the Department of Civil and Environmental Engineering. He is working on the Post-Disaster Recovery Planning for Interdependent Infrastructure Systems at the Resilient Civil Infrastructure (RCIS) Lab where he works as a graduate research assistant under Dr. Abdullahi Salman. Prior to joining UAH, he worked as a structural engineer at Arup, specialized in Structural Integrity Assessment and Impact Assessment. Working on his current interest gives him the opportunity to broaden his knowledge and has opened the door to new concepts in hazard mitigation on a network scale. He is also learning new concepts in Industrial and Systems Engineering and their application in Civil Engineering. He is a member of the Structural Extreme Events and Reconnaissance (StEER) Network, and the Nearshore Extreme Events Reconnaissance (NEER) Association. With these groups, he has access to a broad network of researchers and investigators, and he is able to gather experience in virtual and filed assessment of areas affected by natural disasters. Outside work and school, Izuchukwu likes to travel, read books, and play soccer.

Babak Salarieh is currently a teaching assistant for CE 380 Civil Engineering Materials. He is working on his Ph.D. in Structural Engineering. His research focuses on the Resilience of Coastal Infrastructure and Communities Subjected to Hurricane Hazards. “The aim of my studies is to evaluate the resiliency of the communities against hurricanes, understanding the interdependency of the critical infrastructures, analysis and quantification of the risks (Wind and storm surge), to provide better insight prior to hazard occurrence, preventing further loss of life and property, as well as presenting multi-criteria, optimized framework for post-disaster stage to improve the allocation of the resources and effort for recovery.”
I am a Graduate Teaching Assistant working in the Civil Engineering department at The University of Alabama in Huntsville. My research is focused on traffic engineering. I completed my M.S. from the University of Kansas while working on the project, “Effectiveness of Entertaining, Non-Traffic-Related Messages on Dynamic Message Signs” (Funded by Kansas Department of Transportation, KDOT).

My goal is to pursue a career in transportation engineering.

Irtiza Rafid Khan

Sarah Puchner is a junior civil engineering and math student. As the current UAH American Society of Civil Engineers (ASCE) Vice President and previous concrete canoe chair, she enjoys teaching concrete mix design and helping students discover the benefits of ASCE. She has interned at Miller & Miller, Inc. for the past year working on bridge and culvert construction. When possible, she enjoys being outdoors hiking or reading a good book. Upon graduation, she plans to continue to conduct research and pursue a Ph.D. in Structural Engineering.

Sarah Puchner
Dr. Elias Ali joins the Civil and Environmental Engineering Department as a Lecturer. He received his Ph.D. and M.S. degree in Civil Engineering from Drexel University in 2020 and 2018. Prior to that, Dr. Ali received his first M.S. degree in Civil Engineering from Politecnico di Milano University in 2010, and B.S. degree in Civil Engineering from Arbaminch University, Ethiopia, in 2006.

Dr. Ali has more than 4 years of teaching undergraduate and graduate Civil Engineering courses and more than 5 years professional experience as a structural engineer in various disciplines.

His research interests include: (1) Experimental and computational investigation on the structural response, stability and design of thin-walled structural systems under extreme loading environment such as blast and fire, (2) Investigates the potential application of novel composite materials as thermal barrier in Cold-Formed Steel (CFS) structural framing through both experimental and numerical methods, (3) Material characterization, modeling and optimization of composite materials for resilient structural systems and infrastructures (gas pipelines), and (4) Application of 3D printing in construction.
Dr. Ashraf Al-Hamdan has been promoted to Clinical Associate Professor at UAH. He received his Ph.D. in Civil Engineering from the University of Illinois at Chicago in 2002. Prior to joining the faculty of The University of Alabama in Huntsville, Dr. Al-Hamdan worked as a postdoctoral research associate for three years in the Department of Civil and Environmental Engineering at the University of Central Florida, Orlando, Florida.

Since joining the Department of Civil & Environmental Engineering at UAH in 2007, Dr. Al-Hamdan has taught a variety of undergraduate and graduate courses in Structural, Geotechnical, Water Resources, and Environmental Engineering. He strongly believes that teaching plays a significant role in preparing students to become passionate graduates and competent engineers. He teaches foundational courses in the Civil Engineering curriculum. The student-instructor evaluations of his courses have consistently reflected his outstanding teaching performance and effectiveness as an educator in engineering. Dr. Al-Hamdan also received the UAH College of Engineering Outstanding Faculty Teaching Award in 2014 & again in 2018. He was also honored as the Most Outstanding Civil Engineering Professor in 2016 by Tau Beta Pi – The Engineering Honor Society.

In addition to teaching, Dr. Al-Hamdan has been contributing to student advising, curricular development, student recruitment, and professional activities. His current research work is related to remote sensing and GIS applications to environmental modeling and assessment of water and air quality for public health and ecological uses to improve decision-making and environmental sustainability.
Dr. Tingting Wu was appointed as Associate Professor of Civil and Environmental Engineering. Dr. Wu has been with the Department of Civil and Environmental Engineering since 2014.

Her doctoral research focused on the development and evaluation of engineered media that can be utilized to remove dissolved phosphorus in urban waters from both point source and non-point source. Most recently, she 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, advanced water treatment, and stormwater/non-point source pollution control. Dr. Wu earned her Ph.D. in Environmental Engineering from the University of Florida in Dec. 2010. She received B. Eng and M. Eng from Tongji University, China and the National University of Singapore, respectively.

2. X Han, R Ma, HM Zhang (2020). Energy-aware trajectory optimization of CAV platoons through a signalized intersection. Transportation Research Part C: Emerging Technologies 118, 102652


RESEARCH GRANTS
& CONTRACTS


▶ “Rural Transit Assistance Program”, Sponsored by the Alabama Department of Transportation, October 1, 2020 – September 30, 2022. ($750,000)

▶ “Development of the Office of Local and Rural Transportation”, Sponsored by the Alabama Department of Transportation, November 15, 2019 – September 30, 2022. ($4,500,000)

▶ “Implementing usRAP in Alabama: Covering the State – Phase 6”, Sponsored by the Alabama Department of Transportation, January 1, 2020 – February 28, 2022. ($347,000)


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