COLLEGE OF ENGINEERING
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Department of

CIVIL & ENVIRONMENTAL ENGINEERING

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CHAIR'S MESSAGE

INSIDE

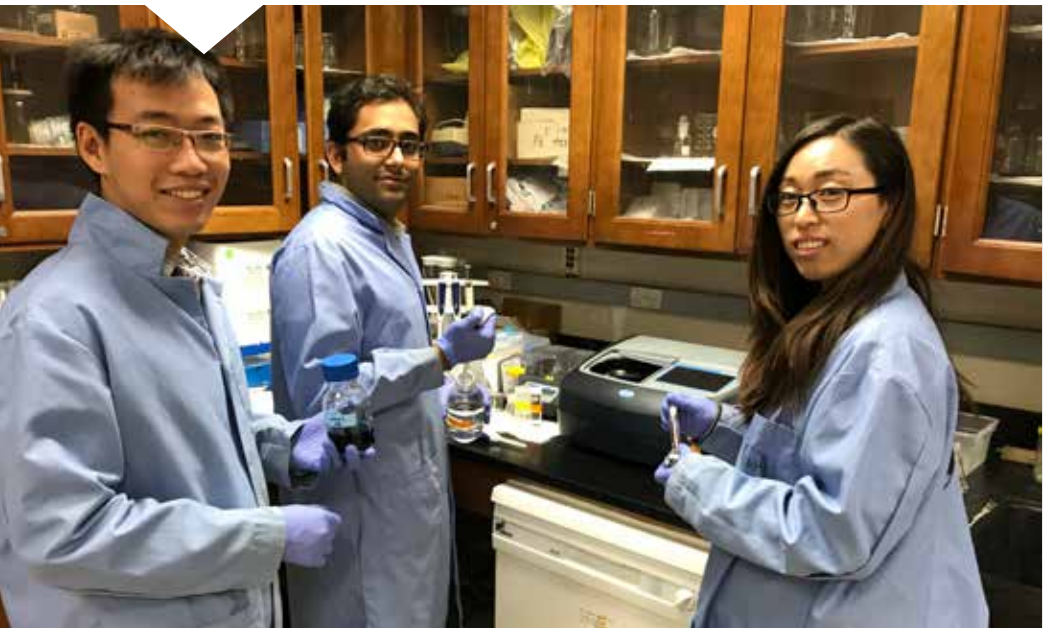
This is an exciting time to be a civil engineer! As the U.S. and many other nations around the world continue to seek innovative ways to reinforce and rebuild their aging infrastructure system, civil engineers are called upon to be well prepared to tackle existing and new societal and environmental challenges while striving to create more sustainable communities. In the wake of recent hurricanes such as Harvey, Irma, and Maria, civil engineers need to reevaluate the building codes and common design practices to strengthen our infrastructure and increase its resiliency to natural and man-made disasters. In this era, emerging technologies in connected and automated vehicles are redefining the future mobility and safety of our transportation system. The good news is that such new challenges create new career opportunities for civil engineers to seek better and more effective solutions to today's societal problems. And the Bureau of Labor Statistics predicts a promising outlook for the job market in civil engineering with an expected 8% growth through 2024 and nearly 23,600 added new jobs.

As the new chair of the CEE Department, I want to extend a warm welcome to our current and new undergraduate and graduate students. This year, our undergraduate and graduate enrollment in civil engineering is up 10 percent and 33 percent, respectively. The number of student credit hours has also increased by 8 percent and 23 percent for undergraduate and graduate students. At UAH, the accredited CEE undergraduate and graduate programs impart the core technical competencies and requisite soft skills such as communication, leadership, research, teamwork, and professional development to our students not only to earn a college degree but also to hit the ground running in a dynamic global job market. In doing so, we leverage our resources to remove any obstacles or roadblocks from the students' path to graduation, as well as encourage our students to step outside their comfort zone by seeking off-campus experiential learning opportunities through internships and study abroad programs. With the ever increasing cost of higher education, we expect our students to receive maximum return on their investment in education. As we continue to focus on student success, our dedicated faculty, instructors, staff, and counselors are always there to offer academic and career advice to students whenever needed. Our industrial advisory board continues to support our education mission and we are truly grateful for that. Our faculty have been highly active in research as demonstrated by the increase in annual research expenditures. As we continue to seek growth opportunities, our Department has just started the search process to fill a new tenure track faculty position for the fall of 2018.

I am delighted to join the CEE Department, and I look forward to working with all constituents on advancing the education and research mission of the Department, the College, and the University.

Sincerely,

Sherif Ishak, Ph.D.
Department Chair



Environmental Engineering Laboratory

by Dr. Tingting Wu

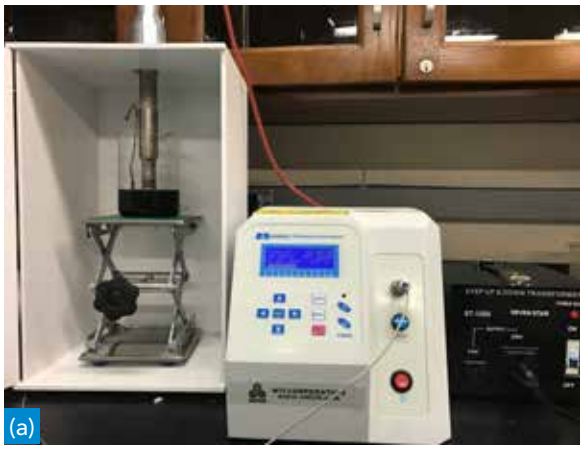
At the Environmental Engineering Lab, we are interested in sustainable water/ wastewater treatment and reuse. Currently we focus on physical/chemical methods such as advanced oxidation processes (AOPs), electrochemical processes, and adsorption, etc. Our research is funded by the National Science Foundation (NSF) and UAH.

We utilize a suite of analysis tools to examine the water quality and evaluate the process performance. Our lab is equipped for environmental engineering treatment process research and development, including water chemical analysis and microbiological studies. Equipment available to use includes a Milli-Q® Direct 16 Water Purification System, incubators, laboratory oven, box /tube furnace, a Phipps & Bird jar test apparatus, COD reactors, a microscope, water chemistry meters, analytical balances, and:

- High-performance liquid chromatography (HPLC) with auto sampler to separate and quantify different compounds in various water matrices.
- Dionex ICS-1600 with auto sampler and RFIC systems.
- Shimadzu TOC-LCPH with auto sampler designed for analysis of organic carbon in various water matrices, utilizing Platinum catalyst, 680°C combustion technique.
- HACH DR 6000 UV-VIS Spectrophotometer with RFID Technology, offering highspeed wavelength scanning across the UV and Visible Spectrum wavelength range of 190 to 1100 nm.
- SP-150 potentiostat, an EIS-capable potentiostat that can address most applications in the area of classical electrochemistry.

We also collaborated with the UAH Department of Chemistry and acquired a state-of-the-art LC-MS-MS system (HPLC/Hybrid Ion Trap-Orbitrap Mass Spectrometer) that allows us to identify and quantify trace-level emerging contaminants (pharmaceuticals, pesticides, personal care products, etc.) in water.

For more details on the Environmental Engineering Laboratory contact Dr. Tingting Wu at tingting.wu@uah.edu or 256-824-6423.



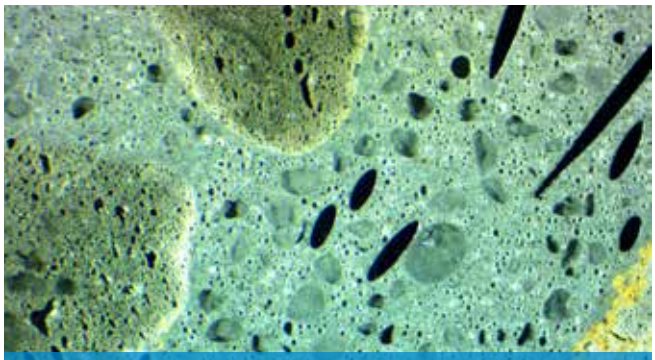
▲ Experimental Setup:
(a) MTI Ultrasonic Processor
(b) SP-150 Potentiostat
(c) HPLC with Auto Sampler

Structural Hazard Mitigation & Intelligent Materials (SHM&IM) Laboratory

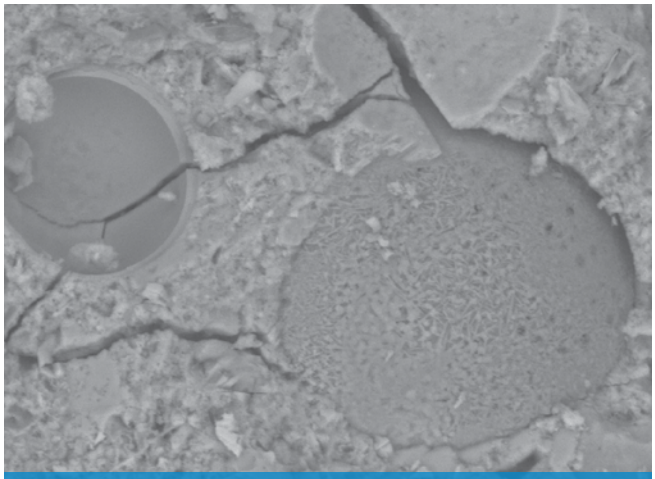
by Dr. Hongyu Zhou

The primary mission of the UAH Structural Hazard Mitigation & Intelligent Materials (SHM&IM) laboratory is to advocate for the sustainable and resilient development of our infrastructures including buildings, bridges, and other built environments. Our research synergistically considers architectural forms, building materials, and structural subsystems as an integrated entirety. Current research areas include (1) energy efficient and low carbon buildings; (2) emerging smart and low embodied-carbon materials and their infrastructural applications; (3) data-informed structural condition assessments and monitoring; and (4) behavior of structures during construction. The lab facility features a self-reacting loading frame, two MTS-810 servo-hydraulic university test systems with 110-kip, and 22-kip load capacities, and MTS Insight elctromechanical test system, and full-function infrastructural material synthesis and characterization laboratory housing equipment including the HotDisk TPS Thermal Constant Analyzer, Hitachi Scanning Electron Microscope, etc.

For more details on this research contact Dr. Hongyu Zhou at hz0009@uah.edu or 256-824-5029.



Microstructure of a thermally insulating and ultra-lightweight concrete used for energy efficient construction



Stress crack propagation within cementitious composite containing fly-ash cenospheres

Test of a steel bridge girder during erection

Concrete Canoe

by Ryan Michael

Concrete canoe has been a tradition here at UAH for the past 30 years with 5 National Championships and 15 Southeastern Regional Championships. We are looking to get back to the National Championship this year that will be hosted by San Diego State University in San Diego, CA on June 23-25, 2018. First, we must design the best canoe that we possibly can not only for looks, but also for holding two and four people in the different races they we compete in. Our team is involved in practicing on the UAH pond to get ready for the three different types of races. The canoe will have to be fast enough to turn with not only two people paddling, but also four people paddling in the boat. Our hull design is going to combine some of our previous designs from national winning canoes to make the very best canoe that we hope will win at the 2018 Southeastern Regionals hosted by Florida University at Gainesville, FL on March 1-3, 2018. We welcome any student engineer who is willing to help and learn.

For more details on this student organization contact us at uah.asce@gmail.com. Also, you can find us on Facebook at www.facebook.com/groups/uah.asce

Bridge Team

by Ryan Michael

The UAH Steel Bridge Team competed in the Southeast Regional Competition for the fourth time in a row in March 2017, and had an overall solid bridge design entering the competition. Our goal every year is to design a bridge that will compete with other schools and improve every year. This past year was the closest we had ever come to qualifying for the national championship. We thrive to teach new students and members the basics of civil engineering and help them to be able to apply the information that they have or will learn in their classes. We also teach students design, fabricating, and teamwork skills that they will be able to use for the rest of their lives. This year we are looking to place among the top four teams and qualify for the 2018 National Steel Bridge Competition that will be hosted by University of Illinois at Urbana–Champaign in Champaign, IL on May 25-26, 2018.

For more details on this student organization contact us at uah.asce@gmail.com. Also, you can find us on Facebook at https://www.facebook.com/groups/uah.asce

Jaehoon Kim

CEE Alumni

Jaehoon Kim graduated from the UAH CEE Department with M.S. (2012) and Ph.D. (2016) degrees in civil (transportation) engineering. During his graduate program, he studied Travel Demand Modeling and Freight Demand Modeling. After graduation, he began his new career as a Senior Modeler in the Forecasting Office at the Tennessee Department of Transportation (TDOT). While working as a senior modeler, he was the leader of the Forecasting Office, as well as performing various tasks. His main task was to lead the overall oversight, maintenance, and updating of the Tennessee Statewide Travel Demand Model. Also, he participated in various projects using model results such as a grant proposal, 3-Year Work Program Profiling, and Rural Regional Transportation Plan. He worked on providing modeling expertise for developing the urban travel demand models to the Metropolitan Planning Organizations in Tennessee. In September 2017, he was promoted as a Forecasting Office Supervisor and since then he has been leading all tasks pertaining to travel demand modeling and analytical tasks for TDOT. He is continuously conducting several individual studies and TDOT internal research projects. Jaehoon published two research papers on a journal in 2017. His research on Reshoring, which was his Ph.D. dissertation topic, was accepted for presentation at the 2018 TRB Annual Meeting in the lectern section.

Micah McHenry

2017 Civil Engineering Outstanding Undergraduate Student

Micah McHenry is a senior from Gadsden, Alabama. He worked as a Project Engineer for three semesters during his co-op at a WestRock paper mill. He is married to his beautiful wife, Sarah McHenry, of nearly two years. Upon his graduation in May 2018, Micah plans to pursue a career of project engineering in the paper industry. Micah says, "I am truly honored to have received this recognition from the extraordinary professors of the UAH Civil Engineering Department. I would like to thank each one for the time and effort they have invested in me during my time at the university."

Comprehensive Investigation of Bike-Vehicle Crashes in Alabama

by Dr. Kirolos Haleem

Dr. Kirolos Haleem received a research grant from the Alabama Department of Transportation (ALDOT) to investigate bike-vehicle crashes in the state. The project would help improve bike-vehicle safety in Alabama by: (1) identifying contributing causes and patterns of bike-vehicle collisions through a detailed review of police reports; (2) developing safety performance functions (SPFs) for bike-vehicle crashes in the state; (3) surveying local drivers and bicyclists on their understanding of biking rules and regulations in the state to develop education programs; (4) performing a before-and-after crash analysis of recently installed bike facilities in the state; and (5) proposing appropriate countermeasures and outreach programs. This study is funding two graduate research assistant students, Ms. Sydnie Fiocca (master's candidate) and Mr. Naveen Mallipaddi (Ph.D. candidate). Ms. Pooja Preetha (Ph.D. candidate in the CEE Department) was also supported from this study during summer 2017 and she helped the research team in the data collection process by reviewing bike crash reports.

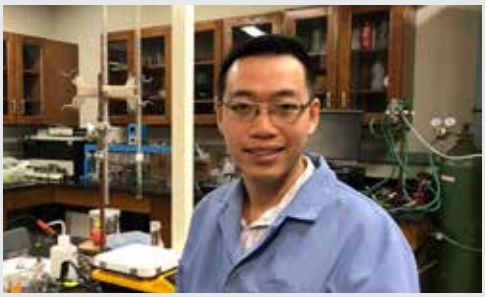
For more details on this research contact Dr. Kirolos Haleem at mm0058@uah.edu or 256-824-7361.

SYDNIE FIOCCA
M.S.E. Student

Sydnie is a graduate student in the CEE Department working towards her master's degree in civil engineering with a focus in transportation engineering. She received her bachelor's degree in civil engineering from UAH in spring 2017. Sydnie is currently working as a graduate research assistant with Dr. Haleem on a bicycle safety study that is sponsored by the Alabama Department of Transportation (ALDOT). She is currently performing statistical crash analysis to identify bicycle crash patterns by reviewing bicycle-vehicle crash reports in detail. Sydnie is also developing an online survey which aims at developing countermeasures and training programs to make cycling safer for bicyclists and drivers in the state of Alabama.

NAVEEN MALLIPADDI
Ph.D. Student

Naveen is a graduate student in the CEE Department, working towards his Ph.D. degree in civil engineering with a focus in transportation engineering. 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. Naveen is currently working as a graduate research assistant 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). Naveen will be also conducting a before-and-after crash analysis of recently-installed bicycle facilities in Alabama, as well as developing countermeasures to alleviate bicycle safety deficiencies in the state.



THANH CHI VU
Ph.D. Student

Thanh is a graduate student in the CEE Department. He earned his bachelor's degree in environmental management and technology from Ho Chi Minh City University of Technology in 2013 and a master's degree in environmental engineering from National Kaohsiung Marine University in 2017. His master study was about environmental monitoring, environmental modeling, soil remediation and wastewater treatment. He is currently working with Dr. Tingting Wu, and his research focuses on adsorption of contaminants in wastewater.

MEHRNAZ DOUSTMOHAMMADI
Research Scientist

Mehrnaz Doustmohammadi graduated with a master's degree in industrial and systems engineering in 2015. Her thesis work focused on improving the accuracy of data used to support traffic impact analysis. After graduation, she continued her work as a research scientist expanding upon her previous background. Mehrnaz has worked on a variety of research topics funded by Alabama Department of Transportation, Alabama Transportation Institute, and Auburn University. Her

projects include the development of models to forecast urban traffic counts, statistical analysis of crashes associated with wet pavement conditions, analysis of future traffic congestion for the 2040 Alabama Needs Assessment, travel demand model support for the Alabama Department of Transportation and Metropolitan Planning Organizations, and driver training using a simulator provided by the Real-Time Instruction for Driving Education (RIDE) for training rural bus drivers.

Mehrnaz's future projects will focus on incorporating safety into the planning process, using traffic count data to improve model accuracy, crash analysis at intersection locations, innovative data collection for trip generation rates and freight trip rates, and close-quarter maneuvering for bus drivers in the state of Alabama.

Mehrnaz is currently working towards a Ph.D. in civil engineering at the University of Alabama in Huntsville. Her research topic is analyzing the use of different statistical modeling techniques to study contributing factors to roadway crashes.

BABAK SALARIEH
Ph.D. Student

Babak is a graduate student in the Civil & Environment Engineering Department seeking his PhD degree with a focus in structural engineering. He earned his bachelor's degree in civil engineering from Khaje Nasir University of Technology, Iran (2013) and a Master's degree from University of Tehran in Marine Structures Engineering (2016). During the pursuit of his M.S. study, he performed seismic analysis and modeling of offshore wind turbines. Babak is currently working with Dr. Hongyu Zhou, and he is a research assistant in the UAH Structural Hazard Mitigation and Intelligent Materials (SHM&IM) Laboratory. Babak's current research works towards better approaches for bridge design, construction and maintenance. He has also participated in several projects pertaining to emerging infrastructural materials including lightweight concrete and cementitious composites, and weather/climate-data informed condition assessment for highway bridge networks.

NILOUFAR SHIRANI BIDABADI
Ph.D. Student

Niloufar is a graduate student in the Civil and Environmental Engineering department. She 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.

Student Graduate Projects and Dissertations

Venkata Sai Naveen Mallipaddi, 2017
Non-Thesis Title: Predicting Crash Risk Factors Using Matched Case Control Logistic Model in State of Alabama
Advisor: M. Anderson

Guillermo I. Reyes, 2017
Non-Thesis Title: Preliminary Analysis of Roadway Characteristics' Influence on Car Crashes Sub-categorized by Roadway Grade
Advisor: M. Anderson

Vikalp Mishra, 2017
Thesis Title: Assimilation of Coupled Microwave/ Thermal Infrared Soil Moisture Profiles Into a Crop Modeling System
Advisor: J. Cruise

New Faculty

XINCHEN ZHANG, joined UAH in fall 2017 as a part-time instructor for the Civil Engineering Graphics course. The course introduces fundamental concepts in computer-aided graphics as they apply to civil engineering. She enjoys helping the students to use graphic tools to solve engineering problems. Ms. Zhang received her master's degree in Construction Engineering from Arizona State University in 2014, where she worked as a teaching assistant to teach AutoCAD. Prior to that, she worked as a staff engineer at Shanghai Geotechnical Engineering Detecting Center performing building and bridge inspections. Through her two years working in Shanghai, Ms. Zhang gained experiences in both analysis tools and in-situ testing techniques including non-destructive and semi-destructive testing (NDT & SDT). She believes hands-on experience is valuable for students as it provides them with the confidence and skills necessary for their own professional development and future success.

DR. SHERIF ISHAK, PE, is a professor and department chair of civil engineering. Prior to joining UAH, he was a professor of civil engineering at Louisiana State University for 16 years. He has over 25 years of experience in the field of transportation engineering with emphasis on intelligent transportation systems, traffic operation and control, traffic flow modeling and simulation, traffic safety, human factors and driving behavior, artificial intelligence and advanced computing applications in transportation, and the new emerging area of connected and automated vehicles. He has served as PI or Co-PI on nearly 35 federal and state funded projects and supervised 30 MS and Ph.D. students to completion. He is also the founder of the Intelligent Transportation Systems lab at Louisiana Transportation Research Center and the LSU driving simulator facility. Dr. Ishak chairs the Transportation Research Board Standing Committee on Artificial Intelligence and Advanced Computing Applications (ABJ70). He is also a board member of the Gulf Region Intelligent Transportation Society and an associate editor for the Canadian Journal of Civil Engineering.

In 2017, Dr. Ishak made presentations at the 5th Annual International Conference on Architecture and Civil Engineering in Singapore, the 3rd Annual International Conference on Transportation in Athens, Greece, the 6th Naturalistic Driving Research Symposium in The Hague, Netherlands, and the GeoMEast International Congress in Egypt. He also organized and chaired a breakout session at the 2017 Automated Vehicles Symposium in San Francisco, California. The session presented recent research on the role of artificial intelligence and advanced machine learning tools for vehicle automation. He has 10 papers accepted for presentation at the upcoming Transportation Research Board meeting to be held in Washington DC in January 2018.

Publications

Al-Hamdan, A.Z., Albashaireh, R.N., Al-Hamdan, M.Z., and Crosson, W.L. (2017) "The association of remotely sensed outdoor fine particulate matter with cancer incidence of respiratory system in the USA", *Journal of Environmental Science and Health: Part A-Toxic/ Hazardous Substances & Environmental Engineering, 52(6), 547-554.*

Ahmadi, A., Doustmohammadi, M., Anderson, M.D.
"An attempt to use interpolation to predict rainfall intensities for crash analysis," *International Journal of Modern Engineering Research. Vol. 7, Issue 5. 2007. pp. 1-4.*

Kim, J., Anderson, M.D., Sarder, M.D.
"Impact of Reshoring Phenomenon on Freight Flow in the U.S." *International Journal for Traffic and Transportation Engineering, Vol 6. No. 3. 2017. pp. 43-52.*

Kim, J., Doustmohammadi, M., Anderson, M.D.
"Analysis of Not At-Fault Truck Crashes in Alabama." *International Journal for Traffic and Transportation Engineering, Vol 6. No. 2. 2017. pp. 28-35.*

Doustmohammadi, M, Anderson, M.D., Swain, J.J.
"Evaluation of Trip Generation at a Free Standing Discount Superstore," *International Journal for Traffic and Transportation Engineering, Vol 6. No. 4. 2017. pp. 495-502.*

Doustmohammadi, M., Anderson, M.D., Doustmohammadi, E.
"Using Log Transformations to Improve AADT Forecasting Models in Small and Medium Sized Communities," *International Journal of Traffic and Transportation Engineering, Vol. 6. No. 2, 2017. pp. 23-27.*

Doustmohammadi, M., Anderson, M.D., Kesavareddy, S., & Jones, S.
"Examining Model Accuracy: How Well did We do in the 1990's Predicting 2015," *International Journal of Traffic and Transportation Engineering, Vol. 6. No. 1, 2017. pp. 15-21.*

Khan, T., Anderson, M.D.
"Development and Statistical Validation of a Simplified Logistic Land Use Change Model," *International Journal for Traffic and Transportation Engineering, Vol 6. No. 4. 2017. pp. 390-405.*

Haleem, K. (2016)
"Investigating Risk Factors of Traffic Casualties at Private Highway-Railroad Grade Crossings in the United States," *Accident Analysis & Prevention, Elsevier, Vol. 95, pp. 274-283.*

Fiocca, S. and K. Haleem (2018)
"Geometric and Operational Investigation of Bicycle Crash Patterns in Alabama," *Poster Abstract Accepted at the 97th Annual Meeting of the TRB, Washington, D.C.*

Mallipaddi, N. and K. Haleem. (2018)
"Comprehensive Bike-Vehicle Crash Investigation on Urban and Rural Roadways in Alabama," *Poster Abstract Accepted at the 97th Annual Meeting of the TRB, Washington, D.C.*

Yang, W., Vogler, B., Lei, Y., Wu, T. (2017)
"Metallic ion leaching from heterogeneous catalysts: an overlooked effect in the study of catalytic ozonation processes." *Environ. Sci. Water Res. Technol. doi:10.1039/C7EW00273D*

Ahmadi, A., Wu, T. (2017)
"Inactivation of E. coli using a novel TiO 2 nanotube electrode." *Environ. Sci. Water Res. Technol. 3, 534–545. doi:10.1039/ C6EW00319B*

Wu, T., Englehardt, J.D. (2016)
"Mineralizing urban net-zero water treatment: Field experience for energy-positive water management." *Water Res. 106, 352–363. doi:10.1016/j. watres.2016.10.015*

Brooks A.L., Zhou H., and Hanna D. (2017),
Comparative study of the mechanical and thermal properties of lightweight cementitious composites. *Construction and Building Materials (Accepted for Publication).*

Brooks A.L., Zhou H., and Shen Z. (2017),
A monolithic "unibody" construction of structural assemblies through vacuum-assisted processing of agro-waste based fiber composites. *Construction and Building Materials, 153: 886-896.*

Shen Z. and Zhou, H. (2017),
Mechanical and electrical behavior of carbon fiber structural capacitors: effects of delamination and interlaminar damage. *Composite Structures, 166: 38-48.*

Shen Z., and Zhou H.,
Carbon fiber-based structural electric capacitors: coupled mechanical-electrical behavior and effect of interlaminar damage. *2016 ASCE Earth and Space Conference Proc., Orlando, FL, April 11 – 15, 2016.*

Shen Z., and Zhou H,
Behavior of curved steel I-girder during early stage of construction: field investigation. *Transportation Research Board 96th Annual Meeting,Washington, DC, January 2017.*

Zhou H., Brooks A.L., Shen Z., and, Hanna D.,
Monolithic "unibody" light-frame structures: an integrated solution for multi-hazard mitigation and building energy enhancement. *Proc. 2016 ASCE Geo-Structural Congress, Phoenix, AZ, April 11 – 15, 2016.*

Research Grants/ Contracts

"A review of Travel Demand Models in Alabama to Support the Alabama Transportation Institute's 2040 Study," *Sponsored by the Alabama Transportation Institute, October 1, 2016, August 31, 2017. ($180K).*

"Implementing usRAP in Alabama: Coving the State – Phase 3", *Sponsored by the Alabama Department of Transportation, September 2017-August 2018, ($361K).*

"Modeling Support for ALDOT and Alabama MPOs", *Sponsored by the Alabama Department of Transportation. October 2017 – September 2018. ($50K).*

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