

Troy C. Hurren

PhD

Staff Consultant



Dr. Troy Hurren is a Staff Consultant at ESi, where he specializes in the engineering analysis of combustion and thermal processes, especially the cause and origin of fires and explosions in a wide array of applications including motor vehicles, residential and commercial structures, and wildfires.

Dr. Hurren has published scientific articles in the areas of combustion analysis, engine performance and emissions characterization of liquid and gaseous alternative fuels as well as traditional fuels used in modern internal combustion engines ranging from light-duty passenger vehicles to heavy-duty marine applications.

Applications of his research include providing practical pathways to a more sustainable transportation sector using alternative fuels and improved traditional powertrain systems, specifically by characterizing combustion and exhaust aftertreatment related emissions.

Dr. Hurren has held a graduate research assistant position at the Bourns College of Engineering Center for Environmental Research and Technology at the University of California, Riverside, and at the Clean Energy Research Center at the University of British Columbia. Dr. Hurren has also participated in a six-month Co-Op with Cummins Inc. at their technical center in Columbus, Indiana.

Education

PhD, Chemical and Environmental Engineering. University of California, Riverside.

MASc, Mechanical Engineering. University of British Columbia.

BS, Mechanical Engineering, Minor in Spanish. Mississippi State University.

Languages

- English (native language)
- Spanish (limited communication)

Contact Information

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ESi Scottsdale

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Areas of Specialization

- Combustion
- Thermal Sciences
- Fire Cause and Origin Investigation

Positions Held

Engineering Systems Inc., Scottsdale, Arizona

- Staff Consultant, 2026 – Present

Cummins Inc., Columbus, Indiana

- Engineer Co-Op, 2025 - 2026

Professional Affiliations/Honors

Society of Automotive Engineers International

- Member, 2026 – Present

Bourns College of Engineering Center for Environmental Research and Technology

- Recipient, William R. Pearson/Ford Graduate Award, 2025

University of California, Riverside

- Recipient, National Science Foundation SPEAKS Fellowship, 2024

Publications

“Gaseous and Particulate Emissions from a Heavy-Duty Natural Gas Engine Operating on Hydrogen-Natural Gas Blends Under Transient and Motoring Conditions,” **T.C. Hurren**, P. Hao, Z. Toumasatos, K.C. Johnson, and G. Karavalakis, International Journal of Hydrogen Energy, Revisions Under Review, 2026.

“Emissions Measurement Challenges Under Euro 7 Heavy-Duty Emissions Standards,” **T.C. Hurren**, S.E. Perez, A.T. Desai, E.S. Miller, N. Schmidt, G. Karavalakis, and M.Y. Khan, SAE Technical Paper, Revisions Under Review, 2026.

“Factors Affecting Real-World Ammonia Emissions Formation from Light-Duty Gasoline Vehicles,” **T.C. Hurren**, H. Nguyen, Z. Toumasatos, and G. Karavalakis, Fuel, Revisions Under Review, 2026.

“Comparing Tailpipe Emissions and Secondary Aerosol Formation from Renewable Naphtha and Gasoline Fuel Blends with Ethanol,” **T.C. Hurren**, M. Han, P. Hao, B. West, D. Collins, and G. Karavalakis, Fuel, Vol 424, 2026.

“Emissions and Combustion Performance of Low Concentration Hydrogen Blends with Renewable Natural Gas from a Heavy-Duty Natural Gas Engine,” **T.C. Hurren**, Z. Toumasatos, K.C. Johnson, and G. Karavalakis, International Journal of Hydrogen Energy, Vol 2058, 2026.

“Effects of Ethanol Blends on Plug-In Hybrid Electric Vehicle Gaseous and Particulate Emissions Formation and Toxicity,” M. Makki, **T.C. Hurren**, A. Canchola, Z. Toumasatos, Y.H. Lin, and G. Karavalakis, Energies, Vol 18, No. 24, 2025.

“The Impacts of Improving Heavy-Duty Internal Combustion Engine Technology on Reducing Nox Emissions Inventories Going into the Future,” **T.C. Hurren**, T. Durbin, K.C. Johnson, and G. Karavalakis, Science of The Total Environment, Vol 986, 2025.

“Nox Measurement and Characterization in a Gaseous Fueled High-Pressure Direct-Injection Engine,” **T.C. Hurren** and P. Kirchen, SAE Technical Paper, 2023-01-1628, 2023.

Presentations

“Navigating Euro 7 Emissions Measurements: Challenges, Best Practices, and Emerging Technologies,” **T.C. Hurren**, S.E. Perez, A.T. Desai, E.S. Miller, N. Schmidt, G. Karavalakis and, M.Y. Khan, SAE World Congress, Detroit, MI, April 14 - 16, 2026.

“Tailpipe Emissions and Secondary Aerosol Formation from a Flex-Fuel Vehicle on Renewable Naphtha-Ethanol Blends,” **T.C. Hurren**, M. Han, P. Hao, B. West, D. Collins, and G. Karavalakis, SAE World Congress, Detroit, MI, April 14 - 16, 2026.

“Effects of Blending Small Fractions of Hydrogen with Natural Gas in Unmodified Heavy-Duty Engine,” **T.C. Hurren**, Z. Toumasatos, K.C. Johnson, and G. Karavalakis, ASME ICEForward Conference, San Antonio, TX, October 20 -23, 2024.

“Air Quality Impacts and NOx Emissions Exposures in Disadvantaged Communities from Heavy-Duty Vocational Vehicles,” **T.C. Hurren**, T. Durbin, K.C. Johnson, and G. Karavalakis, 34th CRC Real Emissions Workshop, San Diego, CA, March 10 -13, 2024.