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# Benjamin Knox, Ph.D., P.E.

Dr. Benjamin Knox is a Managing Engineer at Colwell Consulting where he specializes in the engineering analysis of mechanical and electrical systems, especially regarding the origin, cause and propagation of fires and explosions. Dr. Knox has performed numerous fire origin and cause investigations over a broad range of environments including residential and commercial structures, industrial complexes, vehicles, and wildland. His project experience includes technical analysis of home appliances, oilfield operations, propane and natural gas systems, grid-scale energy storage systems, heating and cooling systems, lithium-ion batteries, electrical distribution equipment, cannabis-related facilities, and intellectual property matters. He has also applied his expertise to the investigation of fires involving heavy trucks, passenger automobiles (conventional, hybrid, and electric), recreational and off-road vehicles, rail, small watercraft, and large marine vessels. Dr. Knox has also evaluated fire related injuries including burns, carbon monoxide poisoning, and smoke inhalation.

Dr. Knox's research and testing experience has focused on ignition mechanisms such as hot surface ignition, self-heating, forced ignition, electrostatic discharge, and sparks/arcs. He has also performed full-scale burn tests to evaluate burn patterns and fire spread. Dr. Knox is active in various fire-related industry organizations and has published scientific articles in the areas of eyewitness reliability, flame dynamics, spray dynamics, autoignition, pollutant formation/oxidation, and detonations.

Prior to Colwell Consulting, Dr. Knox held graduate research assistant positions in the Combustion Laboratory at the Georgia Institute of Technology and The State University of New York at Buffalo. His research focused on developing experimental and numerical methods for studying combusting fuel sprays in land and air-based engines. Dr. Knox also held positions at the Air Force Research Laboratory (Wright-Patterson Air Force Base) and Caterpillar Inc.

## Education

Ph.D., Mechanical Engineering, Georgia Institute of Technology
M.S., Mechanical Engineering, The State University of New York at Buffalo
B.S., Mechanical & Aerospace Engineering, The State University of New York at Buffalo

## Licenses, Certificates, & Certifications

Registered Professional Mechanical Engineer, Arizona, #70504
40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER)

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Fire Investigation 1A: Fire Origin and Cause Determination accredited by the California State Fire Marshal
Advanced Cognitive Interviewing & Forensic Statement Analysis certified by the California Commission on Peace Officer Standards and Training

Professional Honors

Principal Member: Technical Committee on Fire Protection of Cannabis Growing and Processing Facilities, NFPA 420: Standard on Fire Protection of Cannabis Growing and Processing Facilities, National Fire Protection Association, 2022-present.

Principal Member: Technical Committee on Recreational Vehicles, NFPA 1192: Standard on Recreational Vehicles, NFPA 1194: Standard for Recreational Vehicle Parks and Campgrounds, National Fire Protection Association, 2018–present.

Best Paper Award, American Society of Mechanical Engineers, 2014
Society of Automotive Engineers Excellence in Oral Presentation, 2014 and 2016
Georgia Institute of Technology President's Fellowship, 2011-2015
Air Force Research Laboratory Summer Faculty Fellowship, 2009-2011
Mark Diamond Research Fund Grant, 2011
Center for Undergraduate Research and Creative Activities Grant, 2008

Publications

Papageorge, M., Knox, B., Colwell, J. (2024). Full-Scale Vehicle Burn Test of a 2013 Sedan in a Wildfire Setting. *SAE Technical Paper* 2024-01-2503.

Colwell, J., Knox, B. (2022) Reliability of Eyewitness Statements in Fire and Explosion Investigations. *International Journal of Psychological and Behavioral Sciences*, 16(9), 483 - 487.

Knox, B.W., Papageorge, M., Colwell, J.D. (2020). Full-Scale Burn Test of a 2014 Sport Utility Vehicle. *SAE Technical Paper* 2020-01-0925.

Colwell, J.D., Knox, B.W. (2018). Full-Scale Burn Tests of Side-by-Side All-Terrain Vehicles. *SAE Technical Paper* 2018-01-0279.

Magnotti, G.M., Matusik, K.E., Duke, D.J., Knox, B.W., Martinez, G.L., Powell, C.F., Kastengren, A.L., Genzale, C.L. (2017). Modeling the Influence of Nozzle-Generated Turbulence on Diesel Sprays. *ILASS Americas, 29th Annual Conf. on Liquid Atomization and Spray Systems.*

Martinez, G.L., Magnotti, G.M., Knox, B.W., Genzale, C.L., Matusik, K.E., Duke, D.J., Powell, C.F., Kastengren, A.L. (2017). Quantification of Sauter Mean Diameter in Diesel Sprays using Scattering-Absorption Extinction Measurements. *ILASS Americas, 29th Annual Conf. on Liquid Atomization and Spray Systems.*

Knox, B.W., Genzale, C.L. (2017). Scaling Combustion Recession after End-of-Injection in Diesel Sprays. *Combust. Flame* 177 (2017): 24-36.

Jarrahbashi, D., Kim, S., Knox, B.W., Genzale, C.L. (2017). Computational Analysis of End-of-Injection Transients and Combustion Recession. *Int. J. of Engine Research* 18(10):1088-1110.

Knox, B.W. (2016). End-of-Injection Effects on Diesel Spray Combustion. Ph.D. Dissertation, Georgia Institute of Technology.

Knox, B.W., Genzale, C.L. (2016). Effects of End-of-Injection Transients on Combustion Recession in Diesel Sprays. *SAE Int. J. Engines* 9(2):932-949.

Knox, B.W., Genzale, C.L. (2016). Reduced-Order Numerical Model for Transient Reacting Diesel Sprays with Detailed Kinetics. *Int. J. of Engine Research* 17(3):261-279.

Knox, B.W., Genzale, C.L., Pickett, L.M., Garcia-Oliver, J.M., Vera-Tudela W. (2015). Combustion Recession after End-of-Injection in Diesel Sprays. *SAE Int. J. Engines* 8(2):679-695.

Knox, B.W., Franze, M.J., Genzale, C.L. (2015). Diesel Spray Rate-of-Momentum Measurement Uncertainties and Diagnostic Considerations. *J. Eng. Gas Turbines Power* 138(3), 031507.

Falcone, J.A., Knox, B.W., Genzale, C.L. (2015). Identifying Uncertainties in Diesel Spray Rate-of-Momentum Transients under Elevated Back Pressure. *ASME 2015 Internal Combustion Engine Division Fall Technical Conference*.

Knox, B.W. (2011). The Fluidic Obstacle Technique: An Approach for Enhancing Deflagration-to-Detonation Transition in Pulsed Detonation Engines. M.S. Thesis, The State University of New York at Buffalo.

Knox, B.W., Forliti, D.J., Stevens, C.A., Hoke, J.L., Schauer, F.R. (2011). A Comparison of Fluidic and Physical Obstacles for Deflagration-to-Detonation Transition. *49th Aerospace Sciences Meeting and Exhibit Conference*.

Knox, B.W., Forliti, D.J., Stevens, C.A., Hoke, J.L., Schauer, F.R. (2010). Unsteady Flame Speed Control and Deflagration-to-Detonation Transition Enhancement using Fluidic Obstacles. *48th Aerospace Sciences Meeting and Exhibit Conference*.

Peer Reviewer

- SAE International
- Process Safety Progress
- ASME Internal Combustion Engine Division