

Sean Benjamin Kelly, Ph.D., P.E., CFEI, CMAT

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Automotive Expert | Prototyping Engineer | Thermal and Fluid Scientist

Professional Profile

Dr. Kelly specializes in the analysis of products and systems in the automotive, thermal design, consumer product, and industrial environments. His work includes investigations of technical issues related to vehicles, liquid and gas flows, consumer appliances, and consumer electronics. He has particular expertise in automotive component design, especially associated with the engine and powertrain systems - including fuel, ignition, cooling, braking, and drivetrain systems.

His mechanical and aerospace engineering background includes extensive experience in laboratory-based testing and experimental design, advanced manufacturing processes, and rapid prototyping - including a seven-month deployment to Afghanistan for the U.S. Army's Rapid Equipping Force to engineer and manufacture technology solutions directly to soldiers.

Dr. Kelly conducts investigations of failures in ground vehicles and passenger cars and trucks, thermal design issues including industrial heat transfer, consumer appliances, and lithium ion battery failure in devices such as consumer electronics and aircraft. He often performs large-scale testing and analysis in support of his testimony as an expert witness in litigation. Additionally, Dr. Kelly has performed analysis on emissions and pollution-related concerns associated with combustion engines and other devices-including violations of the Clean Air Act and other regulations enforced by the US Environmental Protection Agency (EPA) and California Air Resources Board (CARB).

Prior to joining Exponent, Dr. Kelly was a Research Assistant in the Combustion and Propulsion Laboratory at the University of Florida where he performed research funded by NASA for the Constellation program. His doctoral work focused on cavitation in liquid rocket engines with an emphasis on the Space Shuttle's Main Engines (SSME).

Dr. Kelly has served as an instructor and teaching assistant in over 10 courses in mechanical and aerospace engineering including gas dynamics, propulsion, and machine shop operations at both the undergraduate and graduate levels. He has published and performed peer review of research publications in the American Institute of Aeronautics and Astronautics Journal and Journal of Propulsion and Power.

Before joining the University of Florida, Dr. Kelly held positions at a research company investigating small-scale gas pyrolysis from organic matter for the Defense Advanced Research Project Agency (DARPA), in research and development of industrial and residential fluid metering systems at Neptune Technology Group, as a machinist and instructor at Auburn University, as a plant engineering co-op in tire manufacturing for Michelin North America, and founded and operated C-Tech Racing, a business involved in automotive fabrication and racing, specializing in forced induction (turbocharger) and performance engine systems.

Academic Credentials and Professional Honors

Ph.D., Aerospace Engineering, University of Florida, 2012
B.S., Mechanical Engineering, Auburn University, 2007

American Welding Society Fellowship Award, 2007
President's Scholarship, University of Florida, 2009

Prior Experience

Senior Engineer, Exponent Failure Analysis Associates, Menlo Park, CA, 2012-2017
Rapid Prototyping Engineer (contractor), US Army Rapid Equipping Force, Afghanistan, 2013
Graduate Research Assistant, Combustion and Propulsion Laboratory, University of Florida, 2009-2012
Research Engineer, Green Liquid and Gas Technologies, 2008-2009
R&D Engineer, Neptune Technology Group, 2008
Machinist and Instructor, Auburn University, 2006-2007
Engineering Co-op, Michelin North America, 2005-2006
Owner, C-Tech Racing, 2003-2008

Licenses and Certifications

ASE Certified Master Automobile Technician (CMAT) – # 5507-4728
Licensed Professional Engineer (Mechanical) in California, Utah, Colorado, and Arizona
Fire Investigation 1A Certification, accredited by the California State Fire Marshal
Certified Fire and Explosion Investigator (CFEI, Registration No. 20906-11895)

Selected Publications and Presentations

Lange, R., **Kelly, S.**, Senatore, C., Wilson, J., Yee, R., Harrington, R., "Data Requirements for Post-Crash Analyses of Collisions Involving Collision Avoidance Technology Equipped, Automated, and Connected Vehicles". Proceedings of the 25th International Conference on Enhanced Vehicle Safety (ESV), 2017.
Kelly, S., and Segal, C. "Characteristics of Thermal Cavitation on a Two-Dimensional Hydrofoil", AIAA Journal of Propulsion and Power, Vol. 29, No. 2 (2013), pp. 410-416.
Kelly S., Segal C, Peugeot J., "Simulation of cryogenics cavitation.", AIAA Journal 2011; Vol. 49, No. 11, 2011.
Kelly, S., "Cavitation in Rocket Engines". Presentation to the Clean Combustion Group, KAUST, Jeddah, Saudi Arabia, 2012.

Depositions

Maureen Huffman, Plaintiff, v. Electrolux Home Products, Inc., Defendant; Case No. 3:12CV2681, United States District Court, N.D. Ohio, Western Division, 2015

Academic Appointments

Adjunct Faculty, Department of Mechanical Engineering, San Francisco State University

Professional Affiliations

American Society of Mechanical Engineers (member)
Society of Automotive Engineers (member)
Member, Green Racing Committee, Society of Automotive Engineers International;
Member, Engine Power Test Code Committee, Society of Automotive Engineers International;
National Fire Protection Association (member)