

Exponent®
Engineering & Scientific Consulting

Joel Wilson, Ph.D., P.E.

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Professional Profile

Dr. Wilson specializes in the analysis of vehicles and mechanical systems. His failure analysis work has included passenger car crashes and crashworthiness, accident reconstruction, heavy truck inspections, engine control module (ECM) and event data recorder (EDR) crash module downloads and analysis, off-road vehicles, and all terrain and side-by-side vehicle rollovers.

Other areas include farm implements and tractors, motorcycles, pedestrians, electric wheelchairs/mobility scooters, golf cars, bicycle frames and bike components, trains, lawnmowers, laser-guided vehicles, fuel systems, hydroplaning, electronic throttle control, window regulators, fuel pumps, vehicle fires, unintended acceleration, brake override testing, carbon monoxide poisoning, 12 V battery explosion, power presses, and gantry cranes. Dr. Wilson has performed a DFMEA of electric power steering for autonomous vehicles and advanced driver assistance (ADAS) systems. He has expertise in automotive powertrains and has performed inspections and analyses of direct injection turbo diesel engine vehicles for lemon law litigation, and dual clutch and automatic transmissions.

Dr. Wilson has experience with TREAD reporting and recall analyses for defect investigations and has performed data analyses using the Office of Defect Investigations (ODI) database, the National Automotive Sampling System (NASS) CDS and GES, FARS, SCI, NiTS, and warranty and complaint data. He has assessed motor vehicle structure and restraint system design and FMVSS crash test performance (including 201-interior, 206-door latches, 208-front, 214-side & pole, 216-roof, 301-fuel), and consumer metrics including NHTSA New Car Assessment Program (NCAP) front and side impact, the Insurance Institute for Highway Safety (IIHS) crash tests (moderate offset, small offset, side, roof, and rear), and Highway Loss Data Institute (HLDI). He has assessed safety standards for consumer products. Additionally, he has experience in mechanical design, solid modeling, 3D printing, prototyping, and new product development.

Dr. Wilson’s Ph.D. research focused on the design and testing of head-mounted displays (HMDs) for improved efficiency, situation awareness, and safety in urban/industrial emergency response and firefighting. He has conducted human subjects way-finding experiments with firefighters, which showed the potential navigation efficacy benefit of his HMD. Prior to joining Exponent, Dr. Wilson served as a Postdoctoral Scholar in the Mechanical Engineering Department at the University of California at Berkeley.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering Design, University of California, Berkeley, 2007

M.S., Mechanical Engineering, University of California, Berkeley, 2004

B.S., Mechanical Engineering, University of Colorado, Boulder, 2001

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Licenses and Certifications

Professional Engineer Mechanical, California, #35666

Certified Crash Data Retrieval (CDR) Analyst

Certified Crash Data Retrieval (CDR) Technician

Six Sigma Green Belt Certification (CSSGB)

Professional Affiliations

American Society of Mechanical Engineers

Society of Automotive Engineers

Tau Beta Pi

Publications

Schwall M, Rosenfeld D, Wilson, J. Enhanced tire mark visualization using polarization imaging. ASME International Mechanical Engineering Congress and Exposition (IMECE 2013), San Diego, CA, November 2013.

Schwall M, Wilson J, Mattison D. Post-impact examination of HID headlamps. 2010 Society of Automotive Engineers (SAE) World Congress, SAE Paper No. 2010-01-0056.

Wilson J, Wright P. Head-mounted display efficacy study to aid first responder indoor navigation. Proceedings, IMechE, Part C: Journal of Mechanical Engineering Science 2009; 223(C3):675-688.

Wilson J, Wright P. Design of monocular head-mounted displays, with a case study on firefighting. Proceedings, IMechE, Part C: Journal of Mechanical Engineering Science 2007; 221(12):1729-1743.

Wilson J, Bhargava V, Redfern A, Wright P. A wireless sensor network and incident command system for urban firefighting. Proceedings, IEEE, Mobiquitous, Philadephia, PA, 2007.

Wilson J, et al. Design of monocular head-mounted displays for increased indoor firefighting safety and efficiency. Proceedings, SPIE, Helmet- and Head-Mounted Displays X: Technologies and Applications, Vol. 5800, pp. 103-114, 2005.

Steingart D, Wilson J, Redfern A, Wright P. Augmented cognition for fire emergency response: An iterative user study. Proceedings, HCI International Conference, Augmented Cognition, 2005.

Additional Education & Training

Traffic Accident Reconstruction Course, Northwestern University Center for Public Safety.

Certified Bosch Crash Data Retrieval System Technician and Data Analyst, Collision Safety Institute.