

Dr. Jeff Colwell is a Principal Engineer at ESI where he specializes in the engineering analysis of thermal and combustion processes, especially the cause, origin, and propagation of fires and explosions.

Dr. Colwell has investigated fires and explosions in a wide array of applications including motor vehicles, residential and commercial structures, wildfires, and industrial complexes associated with the chemical, drilling, refining, and mining industries.

Technical issues addressed have included cause and origin determination, burn pattern interpretation, evaluation of ignition mechanisms, smoldering and self-heating, fire spread, smoke transport, smoke detector operation, building evacuation, fire department response, carbon monoxide poisoning, and lithium-ion battery performance. He also evaluates the design and performance of household appliances, heating and cooling equipment, and various other consumer products.

Dr. Colwell's research has focused on fire dynamics, burn patterns, and forced ignition mechanisms, including spark (electrostatic) and hot-surface ignition of combustibles, as well as ignition mechanisms associated with various types of electrical components. He has also conducted research involving complex two-phase flows, liquid atomization, and droplet transport.

Prior to joining ESI, he was a founder of Colwell Consulting, and was previously a Principal Engineer at Exponent where he worked for more than 18 years. Dr. Colwell also held research positions at AlliedSignal Aerospace, the Combustion Laboratory at Arizona State University, the High Temperature Gas Dynamics Laboratory at Stanford University, and the Thermal Sciences and Propulsion Center at Purdue University.

Licenses & Certifications

- Registered Professional Mechanical Engineer, Arizona, #31176
- Registered Professional Mechanical Engineer, California, #M32037
- National Counsel of Examiners for Engineering and Surveying (NCEES) Council Record file No. 51102
- Fire Cause and Origin Investigation 1A and Techniques of Fire Investigation 1B accredited by the California State Fire Marshal; Vehicle Fire Cause and Origin Investigation Course; Fundamentals of Automotive Fuel Delivery Systems Course, Society of Automotive Engineers, and Advanced Cognitive Interviewing and Forensic Statement Analysis, Behavior Analysis Training Institute.

Publications

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Education

Ph.D., Mechanical Engineering,
Arizona State University

M.S., Engineering, Stanford
University

M.S., Mechanical Engineering,
Purdue University

B.S., Mechanical Engineering,
University of Wyoming

Evaluating Fire Propagation into the Passenger Compartment via Full-Scale Burn Testing

Papageorge, M. and Colwell, J. (2024), SAE Technical Paper 2024-01-2502.

Full-Scale Vehicle Burn Test of a 2013 Sedan in a Wildfire Setting,

Papageorge, M., Knox, B. and Colwell, J. (2024), SAE Technical Paper 2024-01-2503.

Reliability of Eyewitness Statements in Fire and Explosion Investigations.

Colwell, J., Knox, B. (2022), International Journal of Psychological and Behavioral Sciences, 16(9), 483 – 487.

Full-Scale Burn Test of a 2014 Sport Utility Vehicle.

Knox, B.W., Papageorge, M., Colwell, J.D. (2020), SAE Technical Paper 2020-01-0925.

Full-Scale Burn Tests of Side-by-Side All-Terrain Vehicles.

Colwell, J.D. and Knox, B.W. (2018), SAE Paper 2018-01-0279.

High-Performance Rear- and Mid-Engine Vehicle Exhaust System Temperatures.

Papageorge, M. and Colwell, J.D. (2018), SAE Paper 2018-01-1436.

Full-Scale Burn Test of a 2007 Cargo Van.

Colwell, J.D. and Henry, C.D. (2016), SAE Paper 2016-01-1403.

Oxidation Patterns in Motor Vehicle Fire Investigations – Unraveling the Myths

Colwell, J. D. (2015), Fire and Arson Investigator, January, 2015, 26-36

Full-Scale Burn Test of a 1998 Compact Passenger Car.

Colwell, J.D. (2014), SAE Paper 2014-01-0426.

Full-Scale Burn Test of a 2001 Full-Size Pickup Truck.

Colwell, J.D. (2013), SAE Int. J. Trans. Safety 1(2). Also in SAE Paper 2013-01-0214.

Full-Scale Burn Test of a 1992 Compact Pickup Truck.

Colwell, J.D. and Cundy, M. (2013), SAE Int. J. Trans. Safety 1(2). Also in SAE Paper 2013-01-0209.

A Review of Oxidation on Steel Surfaces in the Context of Fire Investigations.

Colwell, J.D. and Babic, D. (2012), SAE Int. J. Passeng. Cars-Mech. Syst. 5(2). Also in SAE Paper No. 2012-01-0990.

Ignition of Combustible Materials by Motor Vehicle Exhaust Systems – A Critical Review.

Colwell, J.D. (2010), SAE Int. J. Passeng. Cars-Mech. Syst. 3(1), 263. Also in SAE Paper No. 2010-01-0130.

Steady-State and Transient Motor Vehicle Exhaust System Temperatures.

Colwell, J.D. and Biswas, K. (2009), SAE Int. J. Passeng. Cars-Mech. Syst. 2(1), 206. Also in SAE Paper No. 2009-01-0013.

Case Study on Evacuation Rates within the World Trade Center Towers on September 11, 2001.

Colwell, J.D., Mongia, R. and Reza, A. (2005), 49th Annual Human Factors and Ergonomics Society Conference, Orlando, FL, September 26–30.

Hot Surface Ignition of Automotive and Aviation Fluids.

Colwell, J.D. and Reza, A. (2005), Fire Technology, 41(2), 105–123.

Use of Soot Patterns to Evaluate Smoke Detector Operability.

Colwell, J.D. and Reza, A. (2003), Fire and Arson Investigator, July, 2003, 42–45.

De Novo VOC from Regenerative Thermal Oxidizers.

Martin, R.J. and Colwell, J.D. (2003), ASME Summer Heat Transfer Conference, Paper No. HT2003-40557, Las Vegas, NV, July 21–23, 2003.

Hot Surface Ignition of Jet-A Fuel by Conductive Deposits.

Colwell, J.D., Korb, T.M. and Peck, R.E. (2002), Proc. Combust. Inst., 29, 297-303.

Hot Surface Ignition of Jet-A Fuel by Conductive Deposits.

Colwell, J.D. (2001), Ph.D. Dissertation, Arizona State University.

Ignition of Jet-A Fuel by Silver Oxide Deposits.

Colwell, J.D. and Peck, R.E. (2001), 18th International Colloquium on the Dynamics of Explosions and Reactive Systems, Seattle, WA, August 2001.

Ignition of Jet-A fuel on Silver Oxide Deposits.

Colwell, J.D. and Peck, R.E. (2001) 2nd Joint Meeting of the U.S. Sections of the Combustion Institute, Oakland, CA, March 2001.

Characteristics of Soil-Tripped Rollovers.

Cooperrider, N.K., Hammoud, S.A. and Colwell, J.D. (1998), SAE Paper No. 980022.

An Experimental Study of the Structure of Supercritical Fluid and Conventional Air Paint Sprays.

Senser, D.W., Colwell, J.D. and Smith, R.M. (1995), 22nd Waterborne, High-Solids, and Powder Coatings Symposium, pp. 161–170, New Orleans, LA, February, 1995.

An Experimental Study of Workpiece Interaction Regions and Impact Velocities of Supercritical Fluid Spray.

Senser, D.W., Colwell, J.D. and Nielsen, K.A. (1994), 4th Annual ESD Advanced Coatings Technology Conference, pp. 369–379, Dearborn, MI, November 1994.

A Comparison Between the Structure of Supercritical Fluid and Conventional Air Paint Sprays.

Senser, D.W., Colwell, J.D. and Nielsen, K.A. (1994), 7th Annual Conference on Liquid Atomization and Spray Systems, pp. 35–39, Bellevue, WA, May 1994.

Influence of Temperature on the Structure of Supercritical Fluid Coating Sprays.

Colwell, J.D., Senser, D.W. and Nielsen, K.A. (1993), 24th Annual Meeting of the Fine Particle Society, Chicago, IL, August 1993.

Influence of Pressure and Temperature on the Structure of Supercritical Fluid Coating Sprays

Colwell, J.D. (1993), M.S. Thesis, Purdue University.

Influence on Temperature on the Structure of Supercritical Fluid Coating Sprays.

Colwell, J.D., Senser, D.W. and Nielsen, K.A. (1993), 6th Annual Conference on Liquid Atomization and Spray Systems, pp. 39–43, Worcester, MA, May 1993.

Passenger vehicle fires (Ed.), Fire Protection Handbook, 20th Edition.

Long, R.T., Colwell, J.D., Ray, R., Grossman, H.L., Thomas, B. and Strassburger, R. (2008), In Cote, A.E. National Fire Protection Association, Quincy, MA, Vol. 2, Sect. 21, Chap. 1, pp. 21-3 – 21-14.

Professional Affiliations/Honors

Technical Committee on Recreational Vehicles

- Principal Member,
 - NFPA 1192: Standard on Recreational Vehicles,
 - NFPA 1194: Standard for Recreational Vehicle Parks and Campgrounds,
 - National Fire Protection Association, 2006–2019.
 - ASM MVP Recognition, 2005

Fire Safety Sessions at SAE World Congress, Society of Automotive Engineers

- Committee Chairman and Session Organizer: Fire Safety Sessions at SAE World Congress, 2008–2010

Omicron Delta Kappa

- Pi Tau Sigma, Mortar Board

SAE

- Excellence in Oral Presentation Award, 2009 and 2010
- Lloyd L. Withrow Distinguished Speaker Award, 2012

Union Carbide Corporation

- Outstanding Research Award, 1994

Instructor

- “Fundamentals of Motor Vehicle Fire Investigation” Society of Automotive Engineers, 2009– present.
- “Vehicle Fire Investigation” California Conference of Arson Investigators, San Luis Obispo, California, November 10, 2010.

Editorships

- Associate Editor, SAE International Journal of Passenger Cars – Mechanical Systems, 2010-2021.

Peer Reviewer

- Fire Technology, 2006, 2008, 2010
- SAE World Congress – Fire Safety Session, 2006–2011, 2013–2014