

Erik W. Christiansen, Ph.D., P.E., CFI
Senior Managing Engineer

Professional Profile

Dr. Erik W. Christiansen is a Senior Managing Engineer in Exponent's Thermal Sciences practice. Dr. Christiansen specializes in fire science, combustion chemistry, fluid mechanics, thermodynamics, and heat transfer. He performs origin and cause investigations of fires and explosions, ranging from small residential fires to large-scale industrial incidents to multi-acre wildland fires. He also investigates thermal related failures of consumer appliances; commercial and residential cooking equipment; and heating, ventilation, and air-conditioning (HVAC) systems. Dr. Christiansen's project experience also includes natural gas and propane appliances and systems, oxygen equipment, welding and hot work activities, industrial ovens, furnaces and boilers, runaway chemical reaction (spontaneous combustion), and carbon monoxide (CO) exposure. Additionally, he performs engineering analysis of fire protection systems, including the design, testing, and operation of automatic fire sprinkler systems and dry and wet chemical fire suppression systems. Dr. Christiansen has testified as an expert witness on various occasions.

Prior to joining Exponent, Dr. Christiansen was a research assistant in the Combustion and Energy Laboratory at Princeton University where he conducted research on the effects of flame instabilities on extinction and the limits of flammability.

Academic Credentials and Professional Honors

Ph.D., Mechanical and Aerospace Engineering, Princeton University, 2002
B.E., Mechanical Engineering, The Cooper Union, 1996

Guggenheim Merit Fellowship, Princeton University, 1996; William C. and Esther Hoffman Beller Prize in Mechanical Engineering, The Cooper Union, 1996

Fire Cause and Origin Investigation Training (1A), California Office of State Fire Marshal;
Techniques of Fire Investigation Training (1B), California Office of State Fire Marshal;
Wildland Fire Origin and Cause Determination (FI-210), National Wildfire Coordinating Group;
Advanced Fire/Arson Investigation (Live Burn), California Conference of Arson Investigators;
Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) Certification;
Industrial Furnaces and Ovens Safety Standards Training, Industrial Heating Equipment Association

Licenses and Registrations

Registered Professional Engineer: California, #M32771 (Mechanical); California, #FP1724 (Fire Protection); Nevada, #021098 (Mechanical); Colorado, #45809 (Mechanical)

Certified Fire Investigator (C.F.I.), in accordance with the International Association of Arson Investigators (IAAI), Certificate No. 22-080801

Certified Forklift Operator

Publications

Martin RJ, Christiansen EW. New explosion relief standards impact coating equipment. *Metal Finishing*; 2007; 105:77–81, July.

Christiansen EW, Reza AA. Case study of a TFE explosion in a PTFE manufacturing facility. *Process Safety Progress* 2007; 26(1):77–82, March.

Christiansen EW, Tse SD, Law CK. A computational study of oscillatory extinction of spherical diffusion flames. *Combustion and Flame* 2003; 134:327–337.

Christiansen EW, Law CK. Pulsating instability and extinction of stretched premixed flames. *Proceedings, Combustion Institute*, 2003; 29:61–68.

Yoo SW, Christiansen EW, Law CK. Oscillatory extinction of spherical diffusion flames: micro-buoyancy experiment and computation. *Proceedings, Combustion Institute*, 2003; 29:29–36.

Christiansen EW, Sung CJ, Law CK. The role of pulsating instability and global Lewis number on the flammability limit of lean heptane/air flames. *Proceedings, Combustion Institute* 2001; 28:807–814.

Christiansen EW, Law CK, Sung CJ. Steady and pulsating propagation and extinction of rich hydrogen/air flames at elevated pressures. *Combustion and Flame*, 2001; 124: 35–49.

Christiansen EW, Sung CJ, Law CK. Pulsating instability in near-limit propagation of rich hydrogen/air flames. *Proceedings, Combustion Institute*, 1999, 27:555–562.

Presentations

Christiansen EW, Carnahan R, Reza A, Qin W, Ross B. A case study of two shiploader fires in a coal and pet coke facility. 11th International Conference, Fire and Materials, San Francisco, CA, January 2007.

Christiansen EW, Reza A. A case study of a TFE explosion in a PTFE manufacturing facility. Proceedings, 40th Annual Loss Prevention Symposium, American Institute of Chemical Engineers, April 2006.

Christiansen EW, Reza A. Chemical analysis of fire debris. 2004 Summer Meeting of the California Conference of Arson Investigators, Seaside, CA, July 26–28, 2004.

Christiansen EW, Tse SD, Law CK. A computational study on oscillatory extinction of spherical diffusion flames. 39th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 2001.

Christiansen EW, Sung CJ, Law CK. Pulsating propagation and extinction of rich hydrogen/air flames at elevated pressures. 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

Christiansen EW, Sung CJ, Sun CJ, Law CK. Pulsating instability and flammability limits of one-dimensional planar flames with one-step chemistry and constant properties. Technical Meeting of the Eastern States Section of the Combustion Institute, Hartford, CT, October, 1997.

Professional Affiliations

- Principal Member: Technical Committee on Ovens and Furnaces, NFPA 86 *Standard for Ovens and Furnaces*, National Fire Protection Association
- Principal Member: Technical Committee on Fluid Heaters, NFPA 87 *Recommended Practice for Fluid Heaters*, National Fire Protection Association
- Principal Member: Technical Committee on Industrial and Medical Gases, NFPA 51 *Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting, and Allied Processes*; NFPA 51A *Standard for Acetylene Cylinder Charging Plants*; NFPA 55 *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks*; and NFPA 560 *Standard for the Storage, Handling, and Use of Ethylene Oxide for Sterilization and Fumigation*, National Fire Protection Association
- Combustion Institute (member)
- National Fire Protection Association (member)
- Society of Fire Protection Engineers (member)
- California Conference of Arson Investigators (member)
- International Association of Arson Investigators (member)