

Exponent®
Engineering & Scientific Consulting

Malima Wolf, Ph.D., P.E., CFEI

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Professional Profile

Dr. Wolf specializes in heat transfer and thermodynamics. Her work at Exponent also includes investigating the origin and cause of fires and explosions.

She has conducted scene and laboratory inspections for incidents involving a variety of construction and consumer products, including water heaters, space heaters, gas piping, gas stations and gasoline dispensing systems, and plumbing fittings. She has focused on incidents involving gas systems (natural gas and propane) and gas appliances, including residential and commercial customer and distribution system incidents, and has worked with gas system models including Synergi. Dr. Wolf has also investigated numerous electrical fires, including solar panel fires, and battery-driven fires, including fires allegedly caused by power tools, e-mobility devices including electric bikes, and electric vehicles. She also has extensive experience with polychlorinated biphenyl (PCB) -containing products including electrical equipment such as transformers and light ballasts.

Additionally, Dr. Wolf has broad experience in laboratory and field testing, including the design, construction, and instrumentation of customized experimental apparatus for project-specific problems. Examples include gasoline aging and gas can explosion testing, UL-style testing of consumer appliances, and electrical testing of lightning protection systems and other grounding system components.

Prior to joining Exponent, Dr. Wolf was a Senior Engineer at BlazeTech, Corp., focusing on heat transfer, fire, and safety related projects. She created analytical and numerical models for a variety of heat transfer and fluid projects including burn injury of human skin, thermal deflection, humid heat transfer, cavity formation, and composite degradation. Her experimental work there included the design and instrumentation of laboratory and field fire and heat transfer tests, and hyperspectral image analysis of material streams for separation. She designed and developed novel fire protection systems, including foaming fire suppression systems.

Dr. Wolf's academic work focused on energy use and environmental impact of manufacturing systems. As a researcher at Politecnico di Milano and ITIA-CNR and graduate student at MIT's Environmentally Benign Manufacturing Lab, she focused on the design of recycling systems as manufacturing systems, including performance analysis and facility design. She served as an environmental impact consultant on several research projects while at MIT, including tracking the environmental impact of waste after disposal and evaluating individual environmental impact based on personal lifestyle. Her research interests continue to include green manufacturing and the thermodynamics of materials systems including recycling systems. Also while at MIT, she designed testing apparatus and mechanical components including tooling for underwater robotics systems.

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Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2011

M.S., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2006

B.S., Mathematics, Massachusetts Institute of Technology (MIT), 2004

B.S., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2003

Licenses and Certifications

Master of Self-Propelled Vessels Including Sail or Auxiliary Sail Of Less Than 100 Gross Register Tons (GRT) Upon Near Coastal Waters, , #2520394

Professional Engineer, Hawaii, #PE-20940

Professional Engineer Mechanical, Massachusetts, #52693

Professional Engineer, Oregon, #97257PE

Certified Fire and Explosion Investigator (CFEI)

PADI Certified Open Water Scuba Diver

Professional Affiliations

Member - UL 87 / CSA B346 Joint Technical Committee

Publications

Morse TL, Wolf MI, Kytömaa HK. Ignition of fuel gas jets from leaks in residential gas piping. International Symposium on Fire Investigation. Orlando, FL, September 2024

Davies W, E Wikramanayake, M Wolf, A Hudgins. Transient Effects of Injecting Green Hydrogen into Natural Gas Pipelines. AIChE 10th International Congress on Sustainability Science & Engineering (ICOSSE2021), September 13-15, 2021.

Davies W, M Wolf, M Barry, S O'Hern, T Morse. The Effect of Valve Closure Time on Water Hammer. Proceedings of the ASME 2021 International Mechanical Engineering Congress and Exposition (IMECE2021), November 1-5, 2021.

Ibarreta AF, Colella F, Wolf MI, Yen, M, O'Hern SC, Myers TJ. Modeling of explosion venting fireballs. Proceedings, Mary K O'Connor Process Safety Symposium, College Station, TX, 2019.

Morse TL, Colella F, Wolf MI, Barry MT. Space Heater Fires and Fire Investigation, Proceedings, International Symposium on Fire Investigation Science and Technology, Itasca, IL, 2018.

Ibarreta AF, Colella F, Wolf MI, Vickery J, O'Hern SC, Myers TJ. Measuring leak flow rates in fire and explosion investigations. Proceedings, International Symposium on Fire Investigation Science and Technology, Itasca, IL 2018.

Ibarreta AF, Colella F, Wolf MI, O'Hern SC, Myers TJ. Modeling of explosion venting fireballs. Proceedings, 13th International Symposium on Hazards, Prevention, and Mitigation of Industrial Explosions (ISHPMIE), Kansas City, MO, 2018.

Wolf MI, Colledani M, Gershwin SB, Gutowski TG. A network flow model for the performance evaluation and design of material separation systems for recycling. IEEE Transactions on Automation Science and Engineering, 2013.

Phithakkitnukoon S, Wolf MI, Offenhuber D, Lee D, Biderman A, Ratti C. Tracking trash. IEEE Pervasive Computing, 2013.

Offenhuber D, Wolf MI, Ratti C. Trash Track - Active location sensing for evaluating e-waste transportation. Waste Management & Research, 2013.

Offenhuber D, Lee D, Wolf M, Phithakkitnukoon S, Biderman A, Ratti C. Putting matter in place: tradeoffs between recycling and distance in planning for waste disposal. Journal of the American Planning Association, 2012. JAPA Best Article of 2012

Boustani A, Girod L, Offenhuber D, Britter R, Wolf MI, Lee D, Miles S, Biderman A, Ratti C. Investigation of the waste-removal chain through pervasive computing. IBM Journal of Research and Development, 2011.

Presentations and Conference Papers

Vir Nirankari, Malima Wolf, et al., Metallurgical Characteristics of Perforations due to Arc Damage, International Materials Application & Technologies (IMAT), October 17, 2023.

Oakland County Association of Arson and Fire Investigators, Inc., “OCAAFII Quarterly Training: Recent Updates to NFPA 921, Spontaneous Combustion, and Residential Fuel Gas Explosions," November 17, 2020.

MIT 2.671 Measurement and Instrumentation guest lecture, “Measurement of Saturated Vapor Pressure of Gasoline,” April 30, 2020.

Wolf MI, et al. Robust design of material separation systems for recycling. 10th Global Conference on Sustainable Manufacturing, Istanbul, Turkey, October 31-November 2, 2012.

Wolf MI, et al. Modeling and design of multi-step separation systems. International Symposium on Sustainable Systems and Technology, Washington, DC, May 16-19, 2010.