



Exponent[®]
Engineering & Scientific Consulting

Nicholas Traina, Ph.D.

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Professional Profile

Dr. Traina specializes in the investigation and analysis of fires, explosions, and other thermal events. His background is in mechanical engineering with a focus on fluid mechanics, heat transfer, laser diagnostics, combustion, and fire dynamics. He has extensive experience with fire dynamics in structures and has studied the effectiveness of different fire-service tactics, including ventilation and water application, on controlling fires containing modern residential fuel loads. He has also examined the exposure of radiant and convective heat, carbon monoxide, and hydrogen cyanide to potential occupants and quantified timelines available for escape.

Prior to joining Exponent, he completed his Ph.D. in Mechanical Engineering at the University of Illinois at Urbana-Champaign. His thesis focused on occupant tenability and laser diagnostics in the fire environment. Using laser absorption spectroscopy, he implemented a tunable diode laser technique for measuring water vapor and a mid-infrared laser technique for measuring hydrogen cyanide in the highly corrosive environment created during large-scale fires. He also utilized a porcine skin surrogate model to quantify the risk of steam burns from fire-service water application to occupants.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of Illinois, Urbana-Champaign, 2017

M.S., Mechanical Engineering, University of Illinois, Urbana-Champaign, 2012

B.S., Mechanical Engineering, University of Illinois, Urbana-Champaign, 2012

SFPE Educational and Scientific Foundation Student Scholar Award, 2017

SFPE Chicago Chapter Scholarship, 2016-2017

Licenses and Certifications

Certified Fire and Explosion Investigator, NAFI No. 23195-13378

Certified Vehicle Fire Investigator, NAFI No. 23195-13378v

Prior Experience

Research Assistant, Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, 2013-2017

Teaching Assistant, Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, 2014-2016

Publications

Traina N, Kerber S, Kyritsis DC, Horn GP. Occupant tenability in single family homes part I-Impact of structure type, fire location and interior doors prior to fire department arrival. *Fire Technology* 2017; 53:1589-1610.

Traina N, Kerber S, Kyritsis DC, Horn GP. Occupant tenability in single family homes part II-Impact of door control, vertical ventilation and water application. *Fire Technology* 2017; 53:1611-1640.

Yoo J, Traina N, Halloran M, and Lee T. Minute concentration measurements of simple hydrocarbon species using supercontinuum laser absorption spectroscopy. *Applied Spectroscopy* 2016; 70:1063-1071

Conference Proceedings and Presentations

Traina N, Morrison DR. Applying toxic gas exposure models for fire victim exposure. International Symposium on Fire Investigation, Itasca, IL, September 24-26, 2018.

Cox BC, Bishop J, Ogle RA, Traina N, Prigmore J. Bonded, grounded, and burned to a crisp: electrostatic ignition of flammable gases. 14th Global Congress on Process Safety, Orlando, FL, April 22-25, 2018.

Traina N, Cox BC, Dee SJ. The sweet smell of ammonia hazards. AIChE Midwest Regional Conference, Chicago, IL, March 13-14, 2018.

Traina N, Kerber S, Kyritsis DC, Horn GP. Occupant tenability in residential fires. SFPE Conference and Expo, Montreal, QC, October 9-11, 2017.

Traina N, Kerber S, Horn GP. Effect of firefighter water application on occupant burn risk and tenability. Poster presentation, NFPA Conference and Expo, Boston, MA, 2017.

Traina N, Kerber S, Kyritsis DC, Horn GP. Effect of different ventilation configurations on the fire environment in residential structures. Presentation, 2013 SFPE Annual Meeting: Professional Development Conference and Exposition, Austin, TX, 2013.

Traina N, Kerber S, Kyritsis DC, Horn GP. Effect of external water application on tenability and the fire environment. Poster presentation, NFPA Conference and Expo, Chicago, IL, 2013.

Traina N, Kerber S, Kyritsis DC, Horn GP. Analysis of water application in large-scale residential structures. Presentation, The 8th U.S. National Meeting of the Combustion Institute, Park City, UT, 2013.