Craig G. Weinschenk

Baltimore, MD 21230
Citizenship: United States

Email: `craig.weinschenk@ul.org`

Education

Ph.D. Mechanical Engineering, The University of Texas at Austin, 2011

Dissertation: Experimental and Computational Characterization of Strong Vent Flow Enclosure Fires

M.S. Mechanical Engineering, The University of Texas at Austin, 2007

Thesis: A Study of Firefighter Compliance to Ventilation Standard Operating Guidelines and Development of a Computational Model of a Ventilation Fan

B.S. Mechanical Engineering, Rowan University, 2006

Summa Cum Laude

Professional Experience

Research Engineer
UL FSRI

October 2016 - Present
Columbia, MD

Full-scale fire testing for improving firefighter safety, fire modeling to improve knowledge on fire development and thermal conditions for firefighters, community risk and fire department performance modeling for FireCARES and NFORS projects.

Research Engineer
Jensen Hughes

February 2016 - October 2016
Rockville, MD

Community risk and fire department performance modeling for Fire CARES project. Coupled FDS and Abaqus modeling for structural fire analysis. Development of network based fire model coupled to structural failure model.

Research Fire Protection Engineer
National Institute of Standards and Technology

August 2011 - February 2016
Gaithersburg, MD

A principal developer of NIST's Fire Dynamics Simulator (FDS). Implemented, verified, and validated a partially stirred batch reactor combustion model into FDS designed to improve under-ventilated combustion modeling. Conducted fire modeling studies to provide insight on the fire development and thermal conditions during firefighter fatality and injury incidents. Conducted full-scale field experiments aimed at improving firefighter safety and tactics.

Graduate Research Assistant
The University of Texas at Austin

August 2006 - July 2011
Austin, TX

Constructed fire-hardened, single-compartment scale experimental facility and developed data acquisition/instrumentation infrastructure. Conducted research analyzing the impact of forced and natural ventilation in compartment fires: experimental and numerical studies. Participated in full-scale wildland fire experiments.

Skills

NIST Fire Dynamics Simulator (FDS)
CFAST Zone Model
Small-Scale and Large-Scale Fire Experiments
Fire Instrumentation and Data Collection
Python / NumPy / matplotlib / Pandas / Bokeh / plotly
Fortran / C++ / Matlab
LabVIEW
LaTeX
Subversion / Git

Honors, Awards, & Fellowships

Department of Commerce Silver Medal, 2016
Communicator Award, NIST Engineering Laboratory, April 2015
NRC Postdoctoral Fellow, NIST, 2011-2013
Continuing Bruton Fellowship, The University of Texas at Austin, 2010
Thrust 200 Graduate Fellowship in Engineering, The University of Texas at Austin, 2006-2010
University Preemptive Fellowship, The University of Texas at Austin, 2006
Mechanical Engineering Medallion, Rowan University, 2006
Outstanding Scholar Fellowship, Rowan University, 2002-2006
Eagle Scout - BSA Troop 83, 2001

Research Interests

Fire modeling/simulation and fire dynamics
Turbulent numerical combustion
Verification and validation of fire models
Firefighter hose stream and ventilation tactics
Community risk scale modeling related to the fire service
Scientific and high performance computing, data analytics
PDF evolution using moment methods

Technical Committees

Principal On the SFPE Standards on Design Fire Scenarios (2018)
Principal on the NFPA Fire Service Analysts and Informational Technical Specialists Professional Qualifications (PQU-FSA) (2019)

Publications

Journal Articles

[1] C. Weinschenk, D. Madrzykowski, and P. Courtney. "Impact of Flashover Fire Conditions on Exposed Energized Electrical Cords/Cables". In: *Fire Technology* 56 (2020), pp. 959–991.

[2] C. Weinschenk, K. Overholt, and D. Madrzykowski. "Simulation of an Attic Fire in a Wood Frame Residential Structure, Chicago, IL." In: *Fire Technology* 52 (2016), pp. 1629–1658.

[3] C. Zhang et al. "Simulation methodology for coupled fire-structure analysis: modeling localized fire tests on a steel column". In: *Fire Technology* 52 (1 Jan. 2016), pp. 239–262.

[4] C. Weinschenk and O.A. Ezekoye. "Characterization of a CFD Thermocouple Model Subjected to Stochastic Environmental Forcing using Moment Based Analysis". In: *ASME Journal of Thermal Science and Engineering Applications* 5 (4 Apr. 2013).

[5] C. Weinschenk, C. Beal, and O.A. Ezekoye. "Insights Into Modeling of a Fan Driven Firefighting Tactic Using Nonreacting Flow Data". In: *Journal Soceity of Fire Protection Engineering* 21 (2 2011), pp. 85–114.

[6] C. Weinschenk, O.A. Ezekoye, and R. Nicks. "Analysis of Fireground Standard Operating Guidelines/Procedures Compliance for Austin Fire Department". In: *Fire Technology* 44 (1 2007), pp. 39–64.

Peer Reviewed Technical Reports

[7] K. Stakes et al. *Analysis of the Coordination of Suppression and Ventilation in Milt-Family Dwellings*. Columbia, Maryland: UL Firefighter Safety Research Institute, June 2020.

[8] M. McKinnon, C. Weinschenk, and D. Madrzykowski. *Modeling Gas Burner Fires in Ranch and Colonial Style Structures*. Columbia, Maryland: UL Firefighter Safety Research Institute, May 2020.

[9] C. Weinschenk and R. Zevotek. *Exploratory Analysis of the Impact of Ventilation on Strip Mall Fires*. Columbia, Maryland: UL Firefighter Safety Research Institute, Apr. 2020.

[10] J. Regan, J. Bryant, and C Weinschenk. *Analysis of the Coordination of Suppression and Ventilation in Single-Family Homes*. Columbia, MD: UL Firefighter Safety Research Institute, Mar. 2020.

[11] D. Madrzykowski and C Weinschenk. *Impact of Fixed Ventilation on Fire Damage Patterns in Full-Scale Structures*. Columbia, MD: UL Firefighter Safety Research Institute, Apr. 2019.

[12] C. Weinschenk and D. Madrzykowski. *Impact of Flashover Fire Conditions on Exposed Energized Electrical Cords and Cables*. Columbia, MD: UL Firefighter Safety Research Institute, Mar. 2019.

[13] D. Madrzykowski and C. Weinschenk. *Understanding and Fighting Basement Fires*. Columbia, MD: UL Firefighter Safety Research Institute, Mar. 2018.

[14] D. Madrzykowski et al. *Exposing Fire Service Hose in a Flashover Chamber: Report of Test*. Columbia, MD: UL Firefighter Safety Research Institute, Mar. 2018.

[15] C. Weinschenk, K. Stakes, and R. Zevotek. *Impact of Fire Attack Utilizing Interior and Exterior Streams on Firefighter Safety and Occupant Survival: Air Entrainment*. Columbia, Maryland: UL Firefighter Safety Research Institute, Dec. 2017.

[16] C. Weinschenk, K. Stakes, and R. Zevotek. *Impact of Fire Attack Utilizing Interior and Exterior Streams on Firefighter Safety and Occupant Survival: Water Mapping*. Columbia, Maryland: UL Firefighter Safety Research Institute, Dec. 2017.

[17] C. Weinschenk et al. *Examination of Compressed Air Foam (CAF) for Interior Fire Fighting*. NIST Technical Note 1927. Gaithersburg, MD: National Institute of Standards and Technology, Jan. 2017.

[18] J. Willi, D. Madrzykowski, and C. Weinschenk. *Impact of Hose Streams on Air Flows inside a Structure*. NIST Technical Note 1938. Gaithersburg, MD: National Institute of Standards and Technology, Oct. 2016.

[19] C. Weinschenk, K. Overholt, and D. Madrzykowski. *Simulation of a Wind Driven Basement Fire - Riverdale Heights, MD*. NIST Technical Note 1870. Gaithersburg, MD: National Institute of Standards and Technology, Apr. 2015.

[20] K. Overholt, C. Weinschenk, and D. Madrzykowski. *Simulation of a Fire in a Hillside Residential Structure - San Francisco, CA*. NIST Technical Note 1856. Gaithersburg, MD: National Institute of Standards and Technology, Dec. 2014.

[21] C. Weinschenk, K. Overholt, and D. Madrzykowski. *Simulation of the Dynamics of an Attic Fire in a Wood Frame Residential Structure - Chicago, IL*. NIST Technical Note 1838. Gaithersburg, MD: National Institute of Standards and Technology, Aug. 2014.

[22] K. McGrattan et al. *Fire Dynamics Simulator, Technical Reference Guide, Volume 4: Software Quality Assurance*. NIST Special Publication 1018-4. Sept. 2013.

[23] K. McGrattan et al. *Fire Dynamics Simulator, Technical Reference Guide, Volume 3: Validation*. NIST Special Publication 1018-3. Sept. 2013.

[24] K. McGrattan et al. *Fire Dynamics Simulator, Technical Reference Guide, Volume 2: Verification*. NIST Special Publication 1018-2. Sept. 2013.

[25] K. McGrattan et al. *Fire Dynamics Simulator, Technical Reference Guide, Volume 1: Mathematical Model*. NIST Special Publication 1018-1. Sept. 2013.

[26] K. McGrattan et al. *Fire Dynamics Simulator, User's Guide*. NIST Special Publication 1019. Sept. 2013.

[27] J. Averill et al. *Report on High-Rise Fireground Field Experiments*. NIST Technical Note 1797. Gaithersburg, MD: National Institute of Standards and Technology, Sept. 2013.

In Proceedings

[28] McDermott. R. and C. Weinschenk. "A Partially-Stirred Batch Reactor Model for Under-Ventilated Fire Dynamics". In: *Bulletin of the American Physical Society 58*. Nov. 2013.

[29] C. Weinschenk et al. "A Method to Evaluate Alternative Fire Safety Strategies". In: *13th International Conference and Exhibition on Fire Science and Engineering*. East Windsor, UK: Interflam 2013, June 2013.

[30] J. Floyd, C. Weinschenk, and R McDermott. "A Generic Combustion Modeling and Species Transport Framework for Fire Dynamics Simulator". In: *13th International Conference and Exhibition on Fire Science and Engineering*. East Windsor, UK: Interflam 2013, June 2013.

[31] C. Weinschenk, R. Upadhyay, and O.A. Ezekoye. "Comparison of a Partially Stirred Reactor Model and a Perfectly Stirred Reactor Model for Large Vent Flow Fires". In: *U.S. Joint National Combustion Meeting*. Atlanta, GA. Mar. 2011.

[32] C. Weinschenk and O.A. Ezekoye. "Analysis of Thermocouple Response to Turbulent Radiating Environments". In: *ASME/JSME 2011 8th Thermal Engineering Joint Conference*. Mar. 2010.

[33] P. Kokel, C. Weinschenk, and O.A. Ezekoye. "Evaluation of Directional Flame Thermometer for Real-time Inversion of Heat Flux". In: *International Heat Transfer Conference 14*. Aug. 2010.