Craig G. Weinschenk

4620 N Park Ave 302E
Chevy Chase, MD 20815
Date of Birth: September 7, 1984
Citizenship: United States

Phone: (732) 266-7757
Email: craig.weinschenk@nist.gov
craigweinschenk@gmail.com

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

Professional Experience

Research Fire Protection Engineer   August 2011 - Present
National Institute of Standards and Technology   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   August 2006 - July 2011
The University of Texas at Austin   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.

Undergraduate Research Assistant   May 2004 - August 2004; May 2006 - July 2006
Rowan University   Glassboro, NJ

Conducted on-scene, post-incident investigations regarding vehicle impacts with guiderails throughout the state of New Jersey. Built investigation documents and safety produces. Developed database to catalog investigations.

Engineering Intern   May 2005 - August 2005
Bombardier Transportation (River LINE Services)   Camden, NJ

Developed solutions for safely and efficiently greasing rail lines and for cleaning train wheels during active service to ensure shunting consistency. Developed text and audible indicators for modified service routes.

Publications

1. Weinschenk, C.G., Overholt, K.J., and Madrzykowski, D., Simulation of a Residential Wind Driven Basement Fire - Riverdale Heights, MD, NIST Technical Note 1870, National Institute of Standards and Technology, Gaithersburg, MD, February 2015.

2. Weinschenk, C.G., Overholt, K.J., and Madrzykowski, D., Simulation of the Dynamics of an Attic Fire in a Wood Frame Residential Structure - Chicago, IL, Fire Technology *submitted*.

3. Zhang, C., Silva, J., Weinschenk, C., Kamikawa, D., and Hasemi, Y., Simulation Methodology for Coupled Fire-Structure Analysis: Modeling localized fire tests on a steel column, Fire Technology *submitted*.

4. Overholt, K.J., Weinschenk, C.G., and Madrzykowski, D., Simulation of a Fire in a Hillside Residential Structure - San Francisco, CA, NIST Technical Note 1856, National Institute of Standards and Technology, Gaithersburg, MD, December 2014.

5. Weinschenk, C.G., Overholt, K.J., and Madrzykowski, D., Simulation of the Dynamics of an Attic Fire in a Wood Frame Residential Structure - Chicago, IL, NIST Technical Note 1838, National Institute of Standards and Technology, Gaithersburg, MD, August 2014.

6. Weinschenk, C. and Ezekoye, O.A., Characterization of a CFD Thermocouple Model Subjected to Stochastic Environmental Forcing using Moment Based Analysis, ASME Journal of Thermal Science and Engineering Applications 5 (4), 10, 2013

7. McGrattan, K., Hostikka, S., McDermott, R., Floyd, J., Weinschenk, C., and Overholt, K., Fire Dynamics Simulator, Technical Reference Guide, National Institute of Standards and Technology, Gaithersburg, Maryland, USA, and VTT Technical Research Centre of Finland, Espoo, Finland, Sixth edition, September 2013. Vol. 1: Mathematical Model; Vol. 2: Verification Guide; Vol. 3: Validation Guide; Vol. 4: Configuration Management Plan.

8. McGrattan, K., Hostikka, S., McDermott, R., Floyd, J., Weinschenk, C., and Overholt, K., Fire Dynamics Simulator, UserâĂŹs Guide, National Institute of Standards and Technology, Gaithersburg, Maryland, USA, and VTT Technical Research Centre of Finland, Espoo, Finland, Sixth edition, September 2013.

9. Averill, J., Moore-Merrell, L., Ranellone, R., Weinschenk, C., Taylor, N., Goldstein, R., Santos, R., Wissoker, D., and Notarianni, K., Report on High-Rise Fireground Field Experiments,Technical Note 1797. National Institute of Standards and Technology Gaithersburg, Maryland. April 2013.

10. Weinschenk, C., Beal, C., and Ezekoye, O.A., Insights Into Modeling of a Fan Driven Firefighting Tactic Using Nonreacting Flow Data, Journal Society of Fire Protection Engineering. January 2011 Vol. 21

11. Weinschenk, C., Ezekoye, O.A. and Nicks, R., Analysis of Fireground Standard Operating Guidelines/Procedures Compliance for Austin Fire Department, Fire Technology, 1572-8099, October 04, 2007.

Conference Proceedings

1. McDermott, R., and Weinschenk, C., A Partially-Stirred Batch Reactor Model for Under-Ventilated Fire Dynamics, Bulletin of the American Physical Society 58, November 2013

2. Weinschenk, C. , Forney, G., Averill, J., and Ranellone, R. A Method to Evaluate Alternative Fire Safety Strategies, 13th International Conference and Exhibition on Fire Science and Engineering, Interflam 2013, East Windsor, UK. June 23-26 2013.

3. Floyd, J., Weinschenk, C., and McDermott, R. A Generic Combustion Modeling and Species Transport Framework for Fire Dynamcis Simulator, 13th International Conference and Exhibition on Fire Science and Engineering, Interflam 2013, East Windsor, UK. June 23-26 2013.

4. Weinschenk, C., Upadhyay, R., and Ezekoye, O.A., Comparison of a Partially Stirred Reactor Model and a Perfectly Stirred Reactor Model for Large Vent Flow Fires, U.S. Joint National Combustion Meeting, Atlanta, GA March 2011.

5. Weinschenk, C. and Ezekoye, O.A., Analysis of Thermocouple Response to Turbulent Radiating Environments, ASME/JSME 2011 8th Thermal Engineering Joint Conference, March 13-17, 2011.

6. Kokel, P., Weinschenk, C., and Ezekoye, O.A., Evaluation of Directional Flame Thermometer for Real-time Inversion of Heat Flux, International Heat Transfer Conference 14. August 8-13 2010.

Conference Talks

1. Ontario Professional Fire Fighters Association Health and Safey Conference, February 2015, Broadcast from Washington, DC (*invited*)

2. IAFF Affiliate Leadership Training Summit, January 2015, Anaheim, CA (*invited*)

3. Fire and Evacuation Modeling Technical Conference August 2014, Gaithersburg, MD (*invited*)

4. IAFF Affiliate Leadership Training Summit / N-FORS Stakeholder Meeting, January 2014, Orlando, FL (*invited*)

5. IAFF Redmond Symposium Occupational Health & Hazards of the Fire Service, August 2013, Denver, CO (*invited*)

6. Firehouse Expo, July 2013, Baltimore, MD

7. Metropolitan Fire Chiefs Annual Conference, April 2013, Phoenix, AZ

8. IAFF Affiliate Leadership Training Summit, January 2013, Phoenix, AZ

9. FM Global Open Source CFD Fire Modeling Workshop, May 2012, Boston, MA

Skills and Coursework

NIST Fire Dynamics Simulator
CFAST / BRANZFIRE Zone Models
Small-Scale and Large-Scale Fire Experiments
Fire Instrumentation and Data Collection
Python / NumPy / SciPy / matplotlib
Fortran / C++
Matlab
LabVIEW
LaTeX
Google Code / Issue Tracker Support
Subversion
WordPress / HTML / Website Editing

Incompressible Flow
Thermodynamics
Heat Transfer
Radiation / Participating Media
Convection
Fire Science
Combustion
Turbulent Numerical Combustion
Turbulence
Computational Fluid Dynamics
Differential Equations

Honors, Awards, & Fellowships

NRC Postdoctoral Fellow, NIST, 2011-2013
Continuing Bruton Fellowship, The University of Texas at Austin, 2010
Thrust 2000 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
Performance-based design in fire protection engineering
Structural-fire coupling modeling
Firefighter hose stream and ventilation tactics
Community risk scale modeling related to the fire service
Scientific and high performance computing
PDF evolution using moment methods