FM Global Open Source CFD Fire Modeling Workshop
17-18 April 2024
Four Points by Sheraton Norwood, MA USA

Technical Program

Each oral presentation has a 25 minute time slot for a 20 minutes presentation with 5 minutes for discussion.

Day 1 Wednesday 17 April			
8:30–8:45	**Welcome and Introductions**		
Session 1 Topic: Flame Spread Chair: Yi Wang			
8:45–9:10	Farnaz Beygi Khosroshahi, Fernando Raffan-Montoya, and Stanislav I. Stoliarov	University of Maryland	Characterization of Flammability and Species Yields from Solid Fuels Burning at Controlled Equivalence Ratios Using Fire Propagation Apparatus (FPA)
9:10–9:35	I.T. Leventon, M.V Heck, M.F. Bundy, K.B. McGrattan, and R.D. Davis	NIST	The Impact of Material Composition on Ignitability and Fire Growth: Full-Scale Experiments for Fire Model Validation
9:35–10:00	Rory M Hadden and David Morrisset	The University of Edinburgh	Novel approaches and remaining knowledge gaps in flame spread experiments
10:00–10:25	Baopeng Xu and Jennifer Wen	University of Surrey	On the transition from pulsating to uniform flame spread across alcohol pools – a numerical analysis
10:25–10:45	**Coffee Break and Poster Viewing**		
Session 2 Topic: Fire Dynamics Chair: Rob Barlow			
10:45–11:10	Gang Xiong, Dong Zeng, and Yi Wang	FM Global	A comprehensive dataset of buoyant sooty flames under different oxygen concentrations: implications for CFD modeling.
11:10–11:35	Vinny Gupta, Tony Xiao, Andrew R.W. Macfarlane, Matthew J. Dunn, and Assaad R. Masri	The University of Sydney	Thermal structure of wall fires revealed by Rayleigh scattering
11:35–12:00	Mahmoud K. Ashour, Farnaz Khosravi, Evangelos K. Stefanidis, Francesco Carbone	University of Connecticut	A novel canonical flame configuration for studying non-premixed combustion: the Planar Mixing Layer Flame (PMLF)
12:00–12:25	Guillaume Vignat, Yichi Ma, Nguyen Ly, Nozomu Hashimoto, and Matthias Ihme	Stanford University	Experiment and Computational Analysis of Hot Surface Ignition: Stochastic Ignition and Fuel Effects
12:25–13:25	**Lunch Break**		

Session 3 **Topic: Development and Application of CFD** **Chair: Arnaud Trouvé**			
13:25–13:50	Marcos Vanella, Chandan Paul, Jonathan Hodges, Jason Floyd, Eric Mueller, and Randall McDermott	NIST	Introducing FireX: A High-Performance Computing Branch of FDS
13:50–14:15	Guilherme Fraga, Nicolas Tricard, and Xinyu Zhao	University of Connecticut	Optimal Monte Carlo ray tracing radiation solver parameters for fire simulation
14:15–14:40	Alex Krisman	FM Global	Modeling the suppression of thin melting plastics in FireFOAM
14:40–15:00	**Coffee Break and Poster Viewing**		
Session 4 **Topic: Wildland Fire** **Chair: Randy McDermott**			
15:00–15:25	Mohamed Ahmed, Hazem Al-Bulqini, Arnaud Trouve	University of Maryland	A New Diagnostic to Characterize the Thermal Exposure in Simulations of Wildland Fires
15:25–15:50	Yiren Qin, Dwi M. J. Purnomo, Maria Theodori, Maryam Zamanialaei, Chris Lautenberger, Michael Gollner, Arnaud Trouvé	University of Maryland	Simulations of Flame Spread at the Wildland-Urban Interface in a Landscape-Scale Fire Risk Model
15:50–16:15	Reza Ziazi, Abhinandan Singh, Johanna Aurell, Muthu Kumaran Selvaraj, Brian Gullett, and Albert Simeoni	Worcester Polytechnic Institute	Quantitative Analysis of Flaming and Smoldering Zones Development: Implications for Mass Loss and Emissions in Wildland Fuel Beds for Model Validation
16:15–16:40	Jorge Valdivia, Xiuqi Xi, James L. Urban, and Albert Simeoni	Worcester Polytechnic Institute	Convective ignition of dry vegetation in discrete fire spread at the WUI
Poster Session **Chair: Alex Krisman**			
16:40–17:30	Each author to introduce their poster followed by a general discussion. Please prepare a brief (1–2 slide) summary presentation.		
17:30	**End of Day 1 Technical Program**		
17:45	**Bus Departs from Hotel for Dinner**		

Day 2 Thursday 18 April			
Session 5 **Topic: Flame and Radiation** **Chair: Bart Merci**			
8:30–8:55	David Lignell, Jared Porter, Jansen Berryhill	Brigham Young University	A flame-progress variable model with heat loss for flame and fire applications
8:55–9:20	Ning Ren, Xiaoyi Lu, and Yi Wang	FM Global	Investigating Radiation Absorption/Emission Models for Methanol Pool Fires
9:20–9:45	Jeri At Thabari, Georgios Maragkos, Alexander Snegirev, and Bart Merci	Ghent University	Recent progress in an exploratory study of EDC-finite rate chemistry in large eddy simulations of fire scenarios
9:45–10:10	Fatiha Nmira, Antoine Bouffard, Fengshan Liu, and Jean-Louis Consalvi	Aix-Marseille Université	Assessment of a PAH-based soot production model in laminar coflow methane diffusion flames doped by gasoline surrogate fuels
10:10–10:30	**Coffee Break and Poster Viewing**		
Session 6 **Topic: Battery Fires I** **Chair: John Hewson**			
10:30–10:55	Mohammad Parhizi, Jason Ostanek, Vinay Premnath, Judith Jeevarajan	UL Research Institutes	Multi-Physics Modeling of Thermal Runaway in Lithium-Ion Batteries
10:55–11:20	David Delafuente, Jun Xu	University of Delaware	Deformation and fracture behaviors of cylindrical battery shell during thermal runaway
11:20–11:45	Vinny Gupta, Matthew J. Dunn, Andrew R.W. Macfarlane, Aamir Farooq, Assaad R. Masri	The University of Sydney	Optical investigation of effluent release during thermal runaway of 18650 lithium-ion cells
11:45–12:10	Dong Zeng, Gang Xiong, and Rob Barlow	FM Global and Barlow Combustion Research	Cell-level fire hazards measurement – towards standardization
12:10–13:10	**Lunch Break**		
Session 7 **Topic: Battery Fires II** **Chair: Dong Zeng**			
13:10–13:35	Mike Meehan, Andrew Kurzawski, John Hewson	Sandia National Laboratories	Toward predicting module-to-module cascading failure
13:35–14:00	Andrew Kurzawski, Mike Meehan, John Hewson	Sandia National Laboratories	Limits to cascading propagation based on thermal analysis
14:00–14:25	Danyal Mohaddes, Dong Zeng, Lauren Gagnon, Alex Krisman, Ning Ren, and Yi Wang	FM Global	Lithium-ion battery modeling from cell-level thermal runaway to multi-module fires
14:25 - 14:40	**Coffee Break and Poster Viewing**		
Session 8 **Topic: AI and ML Applications** **Chair: Danyal Mohaddes**			
14:40–15:05	Kuldeep Prasad, Matthew Bundy, Anthony Hamins	NIST	Estimating Fire Heat Release Rate from Orthogonally Placed Video Cameras and Deep Learning
15:05–15:30	Xiaoyi Lu	FM Global	Surrogate modeling for radiative heat transfer using deep operator networks
15:30–16:30	**Discussion**		
16:30	**END OF 2024 WORKSHOP**		

Posters

The posters sizes should be approximately of 594 x 841 mm (24 x 33 inches) in vertical (portrait) orientation. Please prepare a short (1-2 slide) presentation for the poster session on Day 1.

Jansen Berryhill, Jared Porter, Karl Spinti, David Lignell	Brigham Young University	Soot modeling in unsteady, one dimensional flames
Georgios Maragkos, Alexander Snegirev, Bart Merci	Ghent University	Towards predictive CFD simulations of upward flame spread
Jason Floyd, Jonathan Hodges	UL Research Institute	A Scaling-Based Pyrolysis Model for Engineering Applications
Gaurav Argawal	FM Global	Industrial fire hazards: insights and challenges for CFD modeling
Xiaoyi Lu	FM Global	Accelerating FireFOAM simulations by leveraging AMR, GPU, and AI
Lauren Gagnon, Juan Cuevas Rodriguez, and Dong Zeng	FM Global	Inter-Module thermal runaway propagation in a lithium-ion battery Energy Storage System
Muthu Kumaran Selvaraj, Albert Simeoni	Worcester Polytechnic Institute	Numerical modelling of fire spread through discontinuous vegetative fuels without flame contact – A validation study
Wilson Brown, Michael Chak, Rob Barlow, Dong Zeng	FM Global and Barlow Combustion Research	Characterizing thermal runaway in pouch cells: effects of cell chemistry and state of charge