2026 WUI Fire Engineering Summit
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College Park, Maryland, USA

SFPE FOUNDATION
Grand Challenges Initiative

2026 WUI Summit Speakers, Bios, & Abstracts

Abdullah Rehman, MEng, PhD Student
King's College London

Abdullah Rehman is a PhD student in the Heat and Fire Lab at King's College London, funded by the Levrutaaerhulme Centre for Wildfires, Environment, and Society. He obtained his MEng in Biomedical Engineering from Imperial College London in 2022, where he specialised in computational methods and data analysis. Prior to starting his PhD, he worked as a software engineer developing digital twins and surgical simulations. Abdullah's research focuses on understanding wildfire risk and fire spread mechanisms in the Wildland-Urban Interface. The ultimate goal of his PhD is to mitigate wildfire driven impacts to communities using data-driven and physically accurate methodologies.

Poster: Resolving Sub-Metre Fuel Heterogeneity in the Wildland–Urban Interface for Structure-Level Fire Risk Assessment

Wildland–urban interface (WUI) fire risk assessments commonly rely on fuel maps with spatial resolutions on the order of tens of metres, which are insufficient to represent the structure-adjacent fuels that govern fire exposure within the Home Ignition Zone. This presentation introduces a scalable remote sensing framework for sub-metre resolution

	mapping of spatial exposure variables relevant to structure risk. The method applies object-based segmentation and classification to identify individual vegetative and residential fuel elements with a baseline accuracy of 78%. The approach is demonstrated globally and applied to the 2017 Pedrógão Grande Portugal fire, using fuel distributions, separation distances, and wind conditions to develop a structure loss prediction model achieving an accuracy of 75%. Results illustrate how high-resolution fuel mapping improves characterisation of fire exposure and enables parcel- and community-scale risk assessment in regions where detailed fuel data are otherwise unavailable, with direct implications to mitigation planning and exposure reduction.
	**Adetola Koiki, PhD Student** **University of Maryland, College Park** Adetola Koiki is a PhD student in Mechanical Engineering with a concentration in Fire Protection Engineering at the University of Maryland, College Park. She is also a Clark Doctoral Fellow. She received her Bachelor of Aerospace Engineering degree from Auburn University. Her research focuses on experimental fire diagnostics and optical measurement techniques for wildland-urban interface (WUI) fire applications. Her current work involves the development of stereoscopic imaging systems and Particle Tracking Velocimetry (PTV) methods for three-dimensional firebrand trajectory characterization, with broader interests in firebrand transport, fire exposure characterization, and UAV-supported fire sensing. She is part of a multidisciplinary University of Maryland research group investigating the use of UAVs and fire imaging technologies to improve observational data collection and understanding of wildfire and WUI fire behavior. Her work combines fire dynamics, image processing, and experimental diagnostics to support improved fire exposure quantification and future model validation efforts relevant to WUI fire engineering. *Poster: Compact stereoscopic payload for firebrand trajectory characterization* Firebrands are a major driver of structure ignition and fire spread in wildland-urban interface (WUI) fires, yet experimental tools capable of capturing quantitative firebrand transport data remain limited. This work presents the development of a compact

	stereoscopic imaging payload designed for future firebrand trajectory characterization using synchronized multiview imaging. The current work focuses on the design and laboratory validation of the sensing platform, including payload architecture, hardware integration, data acquisition, synchronization, and calibration workflows. The system consists of synchronized lightweight machine vision cameras connected to a compact computing platform and is designed to support future deployment on unmanned aerial vehicle (UAV) platforms. This poster will present the evolution of the payload design from initial laboratory configurations to a UAV-mountable system incorporating stabilized gimbal integration. The broader objective is to establish a compact and deployable system capable of supporting future firebrand exposure characterization, model validation, and WUI fire risk assessment efforts. *Student Pitch: Quantifying Thermally Hazardous Firebrand Exposure in the WUI Using Particle Tracking Velocimetry, Ratio Pyrometry, and UAV Supported Sensing* Wildfires in the wildland-urban interface (WUI) often spread through airborne embers (firebrands), which can ignite homes far ahead of the main fire front. Despite their importance, there is currently no method to measure how many firebrands are present, where they travel, or whether they remain hot enough to ignite structures. This project develops a novel sensing system that combines stereo imaging and thermal measurement techniques to track firebrands in three dimensions and estimate their surface temperature over time. By identifying which firebrands remain thermally hazardous when they land, the system provides critical insight into ignition risk. The platform is designed for both ground-based and UAV-supported deployment, enabling safe data collection near active fires. The resulting data will help improve wildfire risk assessment, validate fire spread models, and support more effective mitigation strategies in vulnerable WUI communities.
	Alana Miska, MS, EIT **Simpson Gumpertz & Heger (SGH)** Alana Miska is an Associate Project Consultant at Simpson Gumpertz & Heger Inc. (SGH), where she provides fire and life safety code consulting for complex building projects across the United States. Her work includes smoke control analysis, egress planning, hazardous materials compliance, and fire protection strategy development. Alana holds

an M.S. in Fire Protection Engineering and a B.S. in Chemical Engineering from Worcester Polytechnic Institute and is an Engineer-in-Training (EIT). Her graduate research on flame spread under non-steady wind conditions was published in Fire Safety Journal. She supports SGH initiatives focused on wildfire resilience and translating evidence-based WUI mitigation into codes, standards, and policy.

Poster: From Practice to Policy: Examining Wildfire Hazard Mitigation & Regulatory Frameworks

Wildfire mitigation guidance is abundant, spanning peer-reviewed research, agency and community programs, and insurer recommendations, yet adoption into codes and policy remains uneven. This presentation describes an evidence-to-policy mapping effort that couples (1) a PRISMA-based systematic review of wildfire hazard mitigation literature and programs with (2) a structured review of model codes and standards (e.g., NFPA 1140/1144 and the ICC International Wildland-Urban Interface Code) plus selected state and local requirements. Findings are synthesized across home and property protection, education and outreach, community and land-use planning, and policy, economics, and insurance. A weighted gap-ranking framework (evidence strength, feasibility, cost, and insurer/regulator alignment) then identifies the most consequential translation gaps and the most actionable opportunities for engineers, AHJs, and policymakers to close them.

	**Albert Presto, PhD** **Carnegie Mellon University** Albert Presto is a research professor in the Department of Mechanical Engineering at Carnegie Mellon University, and the director of the Center for Atmospheric Particle Studies (CAPS). Presto's research focuses on pollutant emissions from energy extraction and consumption and the subsequent atmospheric transformations that these emissions undergo. *Poster: Long-range impacts of WUI fires: Insights from the ASCENT network* This poster will introduce the nationwide Atmospheric Science and Chemistry mEasurement NeTwork (ASCENT). We will show how ASCENT data can be used to quantify impacts of WUI fires, especially on downwind populations which can be locations hundreds of kilometers from the fires.
	Albert Simeoni, PhD **Worcester Polytechnic Institute** Professor Simeoni is an internationally recognized expert in fire and wildland fire and fire science, with over 120 journal papers, conference papers, and book chapters. He has more than 20 years of experience developing experimental, analytical, and numerical techniques to better understand fire dynamics and to predict fire and wildland fire behavior. Before joining WPI, he held academic leadership positions in fire research in the UK (University of Edinburgh) and in France (University of Corsica). He has also experience as a consultant in fire science in the U.S. and has spent over 10 years volunteering and working as a firefighter in France. Starting as a volunteer firefighter, he ultimately led all aspects of fire, wildland fire, and rescue operations, in the capacity of Chief of Fire Station.

	*Poster: Enhancing WUI Resilience; Tier Approach System for Fire shelter Development and Standardization* Wildland–Urban Interface (WUI) fire events increasingly expose communities to extreme radiant heat, ember intrusion, and prolonged smoke conditions, yet there are currently no established standards to guide the development and performance of protective shelters in these environments. This presentation introduces a tiered-based fire shelter framework designed to support WUI resilience through standardized shelter classifications aligned with evacuation and shelter-in-place strategies. The proposed system defines three tiers based on exposure intensity and occupancy duration, integrating structural hardening, ember-resistant design, and air quality control requirements. The framework combines Hazard Mitigation Methodology (HMM) with Fire Protection Engineering (FPE) principles and leverages computational modeling to evaluate thermal exposure, heat transfer, and internal environmental conditions. By establishing quantifiable performance thresholds for each shelter tier, this work aims to provide a scalable, engineering-based foundation for future WUI shelter standardization. The proposed approach supports community-scale resilience planning and aligns with national wildfire risk reduction initiatives. *Panel #3 - WUI Education for Engineers* *Wednesday, August 12, 1:15 – 2:00 pm*
	Aleksander Berg, PhD Candidate **University of Colorado, Boulder** Aleksander Berg is a PhD candidate in Geography and a graduate research assistant at the Institute of Behavioral Science at the University of Colorado Boulder. Overarchingly, his research focuses on how to use big data at fine grained scales to answer questions about natural hazards, health, and population dynamics. His current work pushes these pathways further through the development of data products and methodologies (particularly GeoAI) to deepen our understanding of how people and the environment interact across scales. *Student Pitch: WUI-LLM: A Decision Support Dashboard for High-Quality Wildland Urban Interface Data*

	Our group has published high-quality and peer-reviewed maps of wildland urban interface (WUI) and fire exposure probability maps through time (1990 to 2020) for WUI properties in the contiguous United States. These maps present a detailed view into how U.S. WUI areas have evolved through time and what present wildland fire exposures they may face. A key gap is the dissemination of our high-fidelity information to decision makers and stakeholders. We propose a unified, decision support dashboard, “WUI-LLM,” that collates these data into a clear presentation of how built environments across the U.S. interact with flammable wildlands. WUI-LLM will map structure level WUI classifications and fire exposure probabilities and allow users to interact with these data using a large-language model enhanced query system to allow for on-the-fly spatial analysis. Our dashboard will remove technical barriers in quantifying community risk to wildland fire and how that risk has changed over time.
	**Ali Ashrafi, PhD, PE, CFEI** **Thornton Tomasetti** Dr. Ali Ashrafi received his PhD in Civil Engineering and Engineering Mechanics from Columbia University and is currently a Principal at Thornton Tomasetti. Ali is a licensed Civil and Fire Protection Engineer and a Certified Fire and Explosion Investigator. Ali has overseen numerous projects including performance based structural fire engineering at large-scale industrial and iconic structures throughout the US such as the Shed in New York City, Seaport World Trade Center in Boston, Pittsburgh International Airport, and Kravis Center in Florida. Ali also has extensive experience investigation damages to buildings, including as a result of fires. Ali’s work includes looking at emerging topics in fire safety such as fire safety of mass timber construction, electric vehicles, and energy storage in urban environments, as well as wildfire resilience. Dr. Ashrafi has been an Adjunct Professor at Columbia University, having taught both Structural Fire Engineering and Earthquake and Wind Engineering. Ali is co-chair of the ASCE Fire Protection Committee. *Panel #2 - How Can Engineers Help Drive Better Decision-Making in WUI Communities?* *Tuesday, August 11, 2:00 – 2:45 pm*

Ali Tohdi, PhD
University of Maryland, College Park

Ali Tohidi is an Assistant Professor in the Department of Fire Protection Engineering with affiliate appointments in Mechanical and Aerospace Engineering. His research focuses on fire and fluid dynamics, wildfire and wildland–urban interface (WUI) fire behavior, data-driven and scientific machine learning, and high-performance scientific computing. He is also a Research Faculty member and Co-Principal Investigator within the NSF-supported Wildfire Interdisciplinary Research Center (WIRC).

Poster: Numerical Investigation of Structure-to-Structure Fire Spread: Validation Against Full-Scale Experiments

Structure-to-structure fire spread is a major contributor to losses during wildland–urban interface (WUI) fire events, where thermal radiation plays a critical role in igniting neighboring structures. This study investigates the capability of the Fire Dynamics Simulator (FDS) to predict external fire exposure using validation against two full-scale National Institute of Standards and Technology (NIST) experiments. A systematic sensitivity analysis was conducted to evaluate the influence of key radiation modeling parameters, including optical path length, spectral absorption treatment, radiation fraction, and angular discretization. The results demonstrate that physically consistent radiation modeling substantially improves prediction accuracy for both instantaneous heat flux and accumulated thermal exposure. Optimized configurations achieved strong agreement with experimental measurements across multiple heat flux gauge locations. The findings provide experimentally validated guidance for CFD-based WUI fire exposure assessment and support the development of more reliable community-scale fire spread and structure ignition modeling approaches.

Poster: Mechanistic Insights into Firebrand Deposition over Surface Fuels

Wildfire-related impacts in the Wildland Urban Interface (WUI) areas are increasing due to the elevated risk factors. Firebrand showers are believed to be one of the major causes of fire propagation and losses in the WUI. This study introduces a novel framework for physics-based, systematic characterization of firebrand deposition patterns over surface

	fuels using a series of parametric DEM and coupled CFD-DEM simulations. The results predicted that particle-particle and particle-wall friction, as well as rolling friction, significantly influence the accumulation behavior. For cases in which particles are retained within the domain, higher initial velocities result in greater accumulation than lower velocities. A comparison has also been conducted between pure DEM and coupled CFD-DEM simulations, indicating that in low-velocity scenarios, DEM can describe deposition dynamics, whereas in high-velocity scenarios, the CFD-DEM approach should be adopted.
	**Almoutazbellah Kutkut, PhD** **University of Maryland, College Park** Almoutazbellah Kutkut is a Postdoctoral Research Associate in the Department of Fire Protection Engineering at the University of Maryland. His current research focuses on wildfire and wildland–urban interface (WUI) fire spread modeling using computational fluid dynamics (CFD) and the Fire Dynamics Simulator (FDS) framework. His work involves physics-based investigation of structure-to-structure fire spread, thermal radiation effects, and community-scale WUI fire exposure assessment, with emphasis on model validation against large-scale experimental datasets. Prior to transitioning into fire engineering research, Dr. Kutkut completed his PhD in Mechanical Engineering with research centered on heavy-duty diesel engine combustion, emissions, and machine learning–assisted predictive modeling. His broader expertise spans combustion science, heat transfer, thermo-fluids, numerical modeling, experimental validation, and high-performance computing. His recent work has contributed to ongoing efforts aimed at improving the reliability and physical consistency of WUI fire simulations to support more resilient community design and wildfire risk mitigation strategies. *Poster: Numerical Investigation of Structure-to-Structure Fire Spread: Validation Against Full-Scale Experiments* Structure-to-structure fire spread is a major contributor to losses during wildland–urban interface (WUI) fire events, where thermal radiation plays a critical role in igniting

	neighboring structures. This study investigates the capability of the Fire Dynamics Simulator (FDS) to predict external fire exposure using validation against two full-scale National Institute of Standards and Technology (NIST) experiments. A systematic sensitivity analysis was conducted to evaluate the influence of key radiation modeling parameters, including optical path length, spectral absorption treatment, radiation fraction, and angular discretization. The results demonstrate that physically consistent radiation modeling substantially improves prediction accuracy for both instantaneous heat flux and accumulated thermal exposure. Optimized configurations achieved strong agreement with experimental measurements across multiple heat flux gauge locations. The findings provide experimentally validated guidance for CFD-based WUI fire exposure assessment and support the development of more reliable community-scale fire spread and structure ignition modeling approaches.
	**Amanda Kimball, PE** **Fire Protection Research Foundation** Amanda Kimball, PE, FSFPE, is the Executive Director at the Fire Protection Research Foundation, the National Fire Protection Association (NFPA) research affiliate. Kimball's experience includes fire protection engineering consulting with expertise in building code life safety analyses, design of fire protection systems, fire and egress modeling of buildings and subway stations, and risk analysis. She is the Immediate Past President of the Society of Fire Protection Engineers. *Workshop Facilitator* *Wednesday, August 12, 2:45 – 3:00 pm*
	Amelia Pludow, PhD **Jensen Hughes** Amelia is a senior consultant on Jensen Hughes' wildfire risk mitigation team working out of the Southern California region. She has conducted wildfire research at the parcel scale up to the forest scale and focuses on social vulnerability associated with wildfire risk and the use of spatial analysis to develop risk reduction strategies. She is experienced in

Geographic Information Systems (GIS), risk mitigation and resilience planning, demography, spatial statistics, optimization and modeling. Amelia is especially interested in using innovative datasets and methods to understand spatial and demographic variation in risk and using these findings to inform policy solutions. She currently manages and contributes to wildfire risk mitigation assessment, planning, and research projects for utilities, communities, nonprofits, government agencies and private sector clients across California and in other fire prone regions in North America.

Poster: Beyond Technical Analysis - Lessons in Community and Stakeholder Engagement from a Regional Community Wildfire Protection Plan (CWPP)

Recent wildfire events, including the 2020 Bobcat Fire, 2024 Bridge Fire, and 2025 Eaton Fire, affecting the San Gabriel Valley, have underscored the need for regional approaches to wildfire resilience that extend beyond technical analysis alone. This presentation draws from the development of a Regional Community Wildfire Protection Plan (CWPP) for the San Gabriel Valley Council of Governments (SGVCOG), highlighting how effective community and stakeholder engagement is essential to translating WUI fire engineering into meaningful action. While wildfire hazard and risk analyses provided the baseline foundation of the project, success depended on facilitation, risk communication, and coordination across multiple jurisdictions and stakeholder groups. Through a cohesive engagement process such as public workshops, stakeholder and technical advisory group coordination, the project team worked to make complex wildfire hazards and risk information accessible, credible, and actionable. The presentation shares lessons learned and practical strategies for fire protection engineers supporting community-scale wildfire resilience.

Andrea Santy
XPRIZE Wildfire

Andrea Santy serves as Executive Program Director for XPRIZE Wildfire, one of the most ambitious innovation competitions in the fight against catastrophic wildfires. Since joining XPRIZE in 2023, she has led the $11 million, four-year global competition designed to incentivize the development of breakthrough firefighting technologies — from AI-driven detection systems and autonomous drone fleets to real-time sensing and automated suppression tools.

In this role, Andrea manages all aspects of the competition, engaging a diverse ecosystem of innovators, partners, and stakeholders while facilitating rigorous field testing to validate cutting-edge solutions. Through multiple phases and milestones, Andrea and her team have overseen semifinals and finals testing – from small to large-scale, real-world, live-fire testing in coordination with fire agencies and partners. XPRIZE Wildfire has helped advance scores of solutions that hold the potential to fundamentally transform how the world detects, responds to, and prevents destructive wildfire events.

Keynote #4 - How Is New Technology Making a Difference?
Wednesday, August 12 8:45 – 9:30 am

Andres Felipe Rivas Bolivar, MSc, PhD Student
University of Maryland, College Park

Andres Felipe Rivas Bolivar is a Colombian engineer and PhD student in Aerospace Engineering at the University of Maryland, College Park, where his research sits at the intersection of autonomous robotics and fire protection engineering. Working under the advisement of Dr. Fernando Raffan-Montoya in collaboration with the Department of Fire Protection Engineering, he develops autonomous Unmanned Aerial Vehicle (UAV) systems for the rapid detection, characterization, and suppression of Wildland-Urban Interface (WUI) fires.

His current work centers on a simulation-to-reality framework for multi-UAV coordination, integrating ROS 2 and PX4 autonomy stacks, real-time computer vision for incipient fire

detection, and georeferenced mission planning to support evacuation and first-responder situational awareness. He has validated these pipelines through extensive Software-in-the-Loop and Hardware-in-the-Loop testing, alongside field trials of suppression payloads.

Originally from Colombia, Andres earned both his BS and MSc in Mechanical Engineering from Universidad de Los Andes in Bogota, building foundational expertise in computational mechanics, control systems, and simulation. Since joining the University of Maryland as a Graduate Research Assistant in 2024, he has focused on bridging UAV autonomy with wildfire response, machine learning, and the practical demands of field deployment.

Poster: Autonomous Unmanned Aerial Vehicle (UAV) Applications in Wildland-Urban-Interface (WUI) Fire Scenarios

When a Wildland-Urban Interface fire ignites, the window for safe evacuation can be measured in minutes. This presentation introduces an autonomous "Seeker-Firejumper" UAV framework designed to detect and suppress incipient wildfires before they threaten escape routes.

A Seeker drone, equipped with a custom computer-vision model and an onboard companion computer, autonomously identifies and georeferences new ignition points in real time. It then hands off the target coordinates to a Firejumper drone carrying a smart suppression payload that delivers a localized drop over the fire.

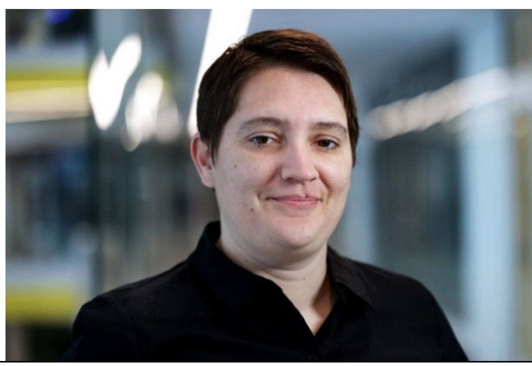
We will share how the full autonomy pipeline, built on ROS 2 and PX4, was validated through Software-in-the-Loop and Hardware-in-the-Loop missions, alongside field tests of the suppression mechanism. By moving from passive aerial observation to active, autonomous suppression, this work offers incident commanders a new tool to slow fire spread and protect WUI communities at the earliest stages.

Student Pitch: Quantifying Thermally Hazardous Firebrand Exposure in the WUI Using Particle Tracking Velocimetry, Ratio Pyrometry, and UAV Supported Sensing

	Wildfires in the wildland-urban interface (WUI) often spread through airborne embers (firebrands), which can ignite homes far ahead of the main fire front. Despite their importance, there is currently no method to measure how many firebrands are present, where they travel, or whether they remain hot enough to ignite structures. This project develops a novel sensing system that combines stereo imaging and thermal measurement techniques to track firebrands in three dimensions and estimate their surface temperature over time. By identifying which firebrands remain thermally hazardous when they land, the system provides critical insight into ignition risk. The platform is designed for both ground-based and UAV-supported deployment, enabling safe data collection near active fires. The resulting data will help improve wildfire risk assessment, validate fire spread models, and support more effective mitigation strategies in vulnerable WUI communities.
	**Andrew Foote** **AXA XL Risk Engineering** Andrew Foote has worked for 15+ years as a loss prevention engineer engaging with commercial property clients across the United States to identify exposures which threaten property and business operations. Since 2018 he has developed a specialized focus on mitigating wildland fire hazards across a broad range of commercial / industrial occupancies and working with these clients to develop and implement strategies for successful outcomes. In the course of these interactions Andrew has worked directly with nearly every major commercial insurance market and is able to share his insights into their risk appetites and hazard identification methodologies. A member of the International Association of Wildland Fire and regular presenter at the Oregon Governors Occupational Safety and Health conferences he brings a wealth of experience and valuable lessons to share with those interested in protecting their property and businesses. *Speaker: Wildfire Loss Prevention in the WUI - A Commercial / Industrial Insurance Perspective* *Tuesday, August 11, 3:05 – 3:25 pm* Well-protected communities require resilient public infrastructure, medical facilities, services, and employment centers. These facilities often feature very different construction methods and materials relative to residential properties and carry unique

	vulnerabilities when challenged by wildland fires. Planning for long-term resilience requires careful and holistic assessment to ensure continuity during and after these events. Join us for a discussion and share observations of what it takes to assess and protect these community keystones.
	**Andrew J. Whelton, PhD** **Purdue University** Andrew J. Whelton, Ph.D., is a Professor of Civil and Construction Engineering and Environmental and Ecological Engineering at Purdue University. An environmental engineer with more than two decades of experience, his work focuses on protecting public health by advancing the safety of water systems, buildings, and infrastructure, particularly following disasters and extreme events. Dr. Whelton is widely recognized for translating scientific discoveries into practical guidance used by communities, utilities, and government agencies. His research has informed protocols and policies adopted by organizations such as the U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, Federal Emergency Management Agency, and National Institute for Occupational Safety and Health. He has provided scientific leadership during major incidents including wildfires, chemical spills, fuel releases, and infrastructure contamination events, helping communities better understand environmental risks and recover safely. His work has also supported the White House and the National Academies of Sciences, Engineering, and Medicine on disaster response and recovery challenges. His team's work continues to advance evidence-based strategies that strengthen infrastructure resilience and safeguard communities worldwide. *Poster: Fire Recovery Decisions: Evidence-based decisions for debris removal, soil restoration, and water utility recovery after destructive wildfires to protect families and business.* Wildland–urban interface (WUI) fires can contaminate residential soils and damage drinking water systems when buildings, vehicles, and household materials burn, releasing asbestos, metals, and organic compounds that pose significant health risks. Following the

	2025 Los Angeles fires, an evidence-based protocol for investigating and restoring drinking water systems was successfully implemented, accelerating recovery. Building on this model, similar science-based approaches for fire debris removal and soil restoration were developed. This presentation summarizes results from residential ash testing across five fires, soil sampling from about 130,000 properties after debris removal in California, Hawaii, and Oregon, and lessons learned from property-specific investigations. Ash analyses found 11 of 18 metals exceeded health or hazardous waste thresholds, while all measured PAHs exceeded residential screening levels. Post-cleanup soil testing showed 16–32% of properties still exceeded at least one health screening level. These findings informed a practical framework to improve cleanup decisions and support safer community recovery.
	**Ankush Jha, PhD Candidate** **Michigan State University** Ankush Jha is a PhD candidate in Civil and Environmental Engineering at Michigan State University, where his research focuses on fire safety engineering, evacuation modeling, and infrastructure resilience under extreme hazards. His work examines how fire dynamics, human behavior, and transportation network performance interact to influence evacuation outcomes in both building-scale and community-scale scenarios. Ankush's research spans fire-induced evacuation modeling, resilience-based performance assessment, and data-informed decision support for hazard mitigation, with a growing emphasis on wildland–urban interface fires. He has contributed to peer-reviewed journal publications and conference presentations in the areas of fire engineering, evacuation analysis, and hazard resilience, and has experience integrating physics-based fire modeling with transportation and evacuation simulations. Ankush has also been actively involved in teaching and mentoring as a graduate assistant, supporting courses in engineering analysis and modeling. His broader academic interests include performance-based fire design, evacuation under uncertainty, and the development of engineering tools to support safer, more resilient communities.

	Poster: Strategies for Enhancing Wildfire Evacuation Efficiency Considering Realistic Fire Spread and Vehicle Obstruction Scenarios Wildfire evacuations in wildland–urban interface communities are increasingly challenged by complex terrain, rapid fire spread, and transportation network disruptions. Many existing evacuation studies assume static road conditions and overlook the combined effects of terrain-driven fire behavior and traffic breakdowns caused by abandoned vehicles. This study proposes an integrated framework to evaluate evacuation network resilience under wildfire scenarios by explicitly coupling fire spread, terrain effects, and dynamic traffic disruptions. Fire progression is modeled using a physics-based wildfire spread approach derived from Rothermel fire behavior formulations, accounting for slope, wind, and fuel characteristics to estimate spatially varying fire arrival times. These arrival times are translated into time-dependent road closures and capacity reductions. Abandoned vehicles are represented as stochastic, temporary obstacles whose likelihood increases with congestion and hazard exposure. Evacuation demand includes ordered evacuees and dislocated occupants with time-dependent departure behavior and multiple safe destinations. Evacuation flows are simulated using dynamic traffic assignments, and resilience is quantified using clearance time and evacuated-before-deadline metrics. Preliminary results indicate that slope-accelerated fire spread and abandoned vehicles substantially reduce evacuation performance, particularly along uphill corridors and critical bottlenecks.
	**Ann Jeffers, PhD** **University of Michigan** Ann Jeffers is an Associate Professor in the Department of Civil and Environmental Engineering at the University of Michigan. Her research is related to analysis of structures subjected to extreme load events, especially fire; various topics in fire safety engineering (e.g., structural fire engineering, smart firefighting, wildland-urban interface fires); advanced finite element methods, including isogeometric analysis; multiphysics simulation, especially coupled fire-structure interaction.

	Moderator, Panel #2 - How Can Engineers Help Drive Better Decision-Making in WUI Communities? *Tuesday, August 11 2:00 – 2:45 pm*
	**Arnaud Trouvé, PhD** **University of Maryland, College Park** Arnaud Trouvé is Professor and Chair in the Department of Fire Protection Engineering at the University of Maryland, College Park, USA. He joined the Faculty in 2001 with a PhD (1989) and Engineering Degree (1985) from École Centrale of Paris, France, and with previous experience as a combustion research engineer. Professor Trouvé's research interests include Computational Fluid Dynamics (CFD) and physical modeling of fire phenomena, including compartment fires, wildland fires, and urban fires. Professor Trouvé is a Fellow of the Combustion Institute and the recipient of the 2017 FORUM Sjölin Award. He has served on many editorial boards of journals in combustion and fire science and is currently on the editorial boards of Combustion Theory and Modelling and the Fire Safety Journal. Professor Trouvé is also a past Chair of the US Eastern States Section of the Combustion Institute (ESSCI) and a Trustee of the International Association for Fire Safety Science (IAFSS). He is a co-Chair of an initiative called the "IAFSS Working Group on Measurement and Computation of Fire Phenomena" (the MaCFP Working Group) and the past Chair of a network of leading higher-education institutions and research laboratories in fire safety engineering called the International Fire Safety Consortium (IFSC). *Co-host* *Opening Remarks* *Tuesday, August 11 8:30 – 8:45 am* *Speaker: Simulations of WUI/Urban Conflagrations with the Landscape-Scale Fire Spread Simulator Called ELMFIRE* *Wednesday, August 12, 11:20 – 11:40 am* We first review computational tools used for understanding and quantifying the fire risk in WUI/urban communities. We differentiate between: "building fire solvers" (and "building-

	cluster fire solvers") that are based on CFD and resolve indoor (outdoor) fire dynamics at single (multiple) building scales; and "urban conflagration solvers" that resolve outdoor fire dynamics at landscape/community scales. Conflagration solvers are used by practitioners to: quantify the fire risk; identify vulnerabilities; design new fire-resilience solutions; help optimize the emergency response; etc. We focus here on ELMFIRE and through ELMFIRE, review current challenges found in urban conflagration solvers: the uncertainties in the physical models that must work at coarse resolution; the uncertainties in the input data (vegetation, topography, building, and meteorological data); the scarcity of suitable validation data on fire dynamics. We also present illustrations of the current performance of ELMFIRE through reconstruction of a selection of past fire disasters in the US. *Closing Panel #5 - Creating the Infrastructure for WUI Fire Engineering Research and Collaboration.* *Wednesday, August 12, 4:30 – 5:00 pm*
	**Arithra Debnath Prithu, Master's Student** **University of Maryland, College Park** A motivated M.S. student in Fire Protection Engineering at the University of Maryland, College Park. Arithra holds a B.Sc. in Mechanical Engineering from Khulna University of Engineering & Technology (KUET), with a strong research background in sustainability, alternative fuels, renewable energy, hydrogen combustion, nano-fluid heat transfer, and thermofluids. His current work focuses on firebrand generation, transport, and accumulation using computational modeling for wildfire applications. Arithra's experience in computational tools, programming, and research-driven analysis focuses on addressing complex physical problems with both theoretical and practical sophistication. *Poster: Mechanistic Insights into Firebrand Deposition over Surface Fuels* Wildfire-related impacts in the Wildland Urban Interface (WUI) areas are increasing due to the elevated risk factors. Firebrand showers are believed to be one of the major causes of fire propagation and losses in the WUI. This study introduces a novel framework for physics-based, systematic characterization of firebrand deposition patterns over surface fuels using a series of parametric DEM and coupled CFD-DEM simulations. The results

	predicted that particle-particle and particle-wall friction, as well as rolling friction, significantly influence the accumulation behavior. For cases in which particles are retained within the domain, higher initial velocities result in greater accumulation than lower velocities. A comparison has also been conducted between pure DEM and coupled CFD-DEM simulations, indicating that in low-velocity scenarios, DEM can describe deposition dynamics, whereas in high-velocity scenarios, the CFD-DEM approach should be adopted.
	**Beth Weckman, PhD** **University of Waterloo** *Workshop Facilitator* *Wednesday, August 12, 2:45 – 3:00 pm* *Poster: Fire Weather Index Correlations to Historical Wildfires in Canadian Indigenous Communities* How do decades of weather data relate to wildfire risk? This presentation summarizes research investigating correlations between Canadian Fire Weather Index (FWI) calculations and historical wildfire occurrence from 1950 to today. The FWI is calculated based on temperature, precipitation, relative humidity, and wind speed. Data was assembled from weather stations based on proximity to more than 10 Indigenous communities, who are disproportionately at risk to wildfire damage. This analysis examines trends in peak and extreme FWI conditions and evaluates how well these align temporally with observed wildfire activity across communities, contributing to the development of transferable risk frameworks for remote and rural Canadian communities.

	**Birgitte Messerschmidt, PSFPE** **National Fire Protection Association** Birgitte Messerschmidt is Director, Research, National Fire Protection Association. She is responsible for NFPA's Research Strategy, Research on fire problems and other safety issues, Data collection efforts to maintain NFPA's fire incident and fire service databases and the NFPA Research library. She has a M. Sc. In Civil Engineering from the Technical University of Denmark and has spent her entire career working on fire safety issues. Making our built environment more resilient to fire through better understanding of the impact of construction products and methods, as well as testing procedures and policy has been a career long passion. She has been involved in testing and research as well as standardization and advocacy. She has published and presented numerous papers on fire safety issues. *Moderator: Student Pitch Competition* *Tuesday, August 11, 12:00 – 12:30 pm and Wednesday, August 12, 12:10 – 12:15 pm* *Panel #2 - How Can Engineers Help Drive Better Decision-Making in WUI Communities?* *Tuesday, August 11, 2:00 – 2:45 pm* *Workshop Facilitator* *Wednesday, August 12, 2:45 – 3:00 pm*
	Brookelyn Conner, Master's Student **Oklahoma State University** Ms. Brookelyn Conner is a graduate student in Fire Safety and Explosion Protection master's degree program at Oklahoma State University. She has been conducting research to quantitatively assess WUI fire resilience of communities for the past 1.5 years. She has previously worked as a safety manager at Industrial Project Innovation (IPI) in Kansas City.

Poster: Development of a community-specific WUI fire resilience assessment model

Numerous efforts have been undertaken to improve resilience to wildland–urban interface (WUI) fires; however, the effectiveness and efficiency of these measures remain difficult to quantify. This challenge arises in part because WUI fire outcomes are governed by a wide range of interconnected performance attributes, making comprehensive resilience assessment highly complex. Furthermore, each WUI community exhibits unique characteristics across these attributes, complicating the selection of appropriate mitigation strategies. In this study, we developed two performance-based WUI fire resilience assessment models through the systematic anatomization of both regulatory codes and documented WUI fire outcomes into detailed performance attributes related to wildfire behavior, structural vulnerability, and human/community factors. These attributes and their interdependencies are organized across the four emergency management phases: mitigation, preparedness, response, and recovery. The resulting framework enables structured comparisons across communities with differing safety conditions and supports the development of tailored resilience strategies for WUI fire risk reduction.

Carlos Murillo-Rueda, PhD
INERIS

Carlos Murillo is a fire safety engineer at INERIS, the French National Institute for Industrial Environment and Risks, based in France. He specializes in the CFD-based modelling of hazardous phenomena related to major industrial accidents, with a particular focus on fires, explosions, and the dispersion of hazardous and toxic gases. In his current role at INERIS, he leads and contributes to advanced consequence modelling studies supporting both industrial stakeholders and public authorities, from scenario definition to the interpretation of complex physical phenomena.

Carlos holds a PhD in Process and Product Engineering from Université de Lorraine, where his research focused on the experimental and numerical analysis of combustion and explosion-related phenomena. His academic background provides a strong foundation in physics-based and phenomenological modelling approaches, which he

	applies to the development and validation of CFD models for fire behaviour and thermal effects. Through his work, Carlos actively contributes to the improvement of modelling methodologies and tools used in fire and explosion safety assessments, bridging applied research and engineering practice in the field of industrial fire safety. *Poster: Hydrogen Storage Blowout Scenarios As Wildfire Ignition Sources In Wildland–Urban Interface Environments* The large-scale deployment of hydrogen as an energy carrier raises critical safety challenges, particularly for underground storage facilities located near forested and wildland–urban interface (WUI) areas. This presentation addresses the potential fire and wildfire risks associated with accidental hydrogen releases from underground storage in salt caverns. Within the framework of the European FRHYGE project, a CFD-based consequence analysis was conducted for the hydrogen storage site of Manosque (France), focusing on a blowout scenario at the wellhead. Using Fire Dynamics Simulator (FDS), the study evaluates hydrogen dispersion, ignition, and resulting thermal radiation effects, accounting for local topography. The simulations identify forested zones exposed to critical heat flux levels exceeding 8 kW/m^2, indicating a high susceptibility to fire ignition. An additional wildfire simulation explores potential cascading effects between hydrogen infrastructure accidents and wildfire initiation. The results provide valuable insights for risk assessment and mitigation strategies for hydrogen storage facilities in fire-prone environments.
	Carol Rice, Certified Senior Wildland Fire Manager **Wildland Res Mgt** Carol Rice leads Wildland Res Mgt, which for 45 years has emphasized fire management consulting, especially in the urban/wildland interface. Carol has overseen and planned implementation of local and regional vegetation management plans in California. She has conducted risk assessments on various scales, ranging from parcels to entire countries, to catastrophe risk models for re-insurance entities.

She has written or presented over 50 technical papers and presentations addressing fire ecology, fire behavior, and risk assessment in the urban wildland interface. Ms. Rice has prepared management plans dealing with vegetation management, structure ignition prevention and resource enhancement for many landowners throughout California. These best practices have been compiled into a reference book, Managing Fire in the Urban Wildland Interface: Practical Solutions.

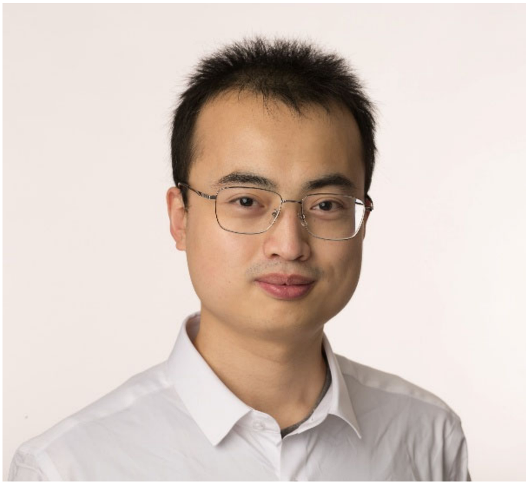
She was a founding member of the Wildland Fire Section for the National Fire Protection Association serving on its Board for 10 years. Similarly, she was on the founding board of the International Association of Wildland Fire (serving for 12 years) and is Past Chair of the California-Nevada-Hawaii Fire Council.

She holds a BS in Forestry and a MS in Fire Science and Management, both from the Department of Forestry and Resource Management University of California, Berkeley.

Poster: Wildfire Risk Analysis supporting evacuation timing decisions at the Lawrence Berkeley National Laboratory, Berkeley, CA

To support wildfire preparedness and evacuation planning, this Wildfire Risk Analysis provides a detailed, location-specific foundation for understanding wildfire hazard (potential intensity and spread of wildfires) and risk (likelihood of wildfire exposure to structures and assets) at the Lawrence Berkeley National Laboratory (LBNL) in Berkeley, California. The risk analysis supports science-driven emergency preparedness by identifying the most vulnerable areas of the LBNL site and vicinity, quantifying fire behavior potential, and developing data-informed strategies to protect personnel during wildfire events.

This data-driven risk analysis employed a variety of tools, spanning wildland fire behavior prediction software packages FlamMap and FARSITE, in combination with a new way of modeling fire growth, Inverse Arrival Time. These models inform the Lab's protective action strategies and general wildfire emergency preparedness, integrating site-specific evacuation time estimates to develop protective action decision zones. The trigger points

	required additional decisions on time-bound objectives and the definition of acceptable risk.
	**Chenzhi Ma, PhD** **University of Nevada, Reno** Dr. Chenzhi Ma is a postdoc scholar at the University of Nevada, Reno, working on the WUI fire building damage assessment and fire spread modeling. He finished his PhD program at Johns Hopkins University under the supervision of Dr. Thomas Gernay, working on building fire response analysis, especially on composite steel frame structures. Before joining Johns Hopkins University, he completed his bachelor's degree at Central South University and his master's degree in civil engineering at Tongji University in China, focusing on seismic risk reduction. He has received honors, including the Excellent Master's Thesis at Tongji University and Outstanding Undergraduate of Central South University, and he was also the recipient of the Richard D. Hickman Fellowship at Johns Hopkins University *Poster: Structural-Level Probabilistic Wildfire Risk Assessment: Integrating Physics- and Machine-Based Models for WUI Damage Assessment* The increasing Wildland–Urban Interface (WUI) fire conflagrations in recent wildfire incidents highlights the need for tools and methods for pre-fire structural-level damage prediction and risk assessment. We introduce an interpretable machine-learning-based fragility model as part of a modular probabilistic wildfire risk assessment framework to predict WUI structures damage probabilities. The machine-based model is built from multi-source geospatial data, integrating over 50,000 CAL FIRE Damage Inspection (DINS) records with weather, building footprints, NAIP imagery, and canopy-height products, and includes physics-based features to quantify direct flame-contact potentials, radiative heating from surroundings, and ember exposures. The model predicts the probability of structural damage at a structure-level. The predicted damage probabilities are designed to construct fragility functions, which are then used as the damage assessment module within a probabilistic wildfire risk assessment framework.

	**Chris Lautenberger, PE, PhD** **President & CEO, CloudFire, Inc.** Chris Lautenberger is a fire scientist with an MS in Fire Protection Engineering from WPI and a PhD in Mechanical Engineering from UC Berkeley. He is a licensed Fire Protection Engineer in California. Chris has been active in the fire modeling field for 25 years with interests ranging from soot formation in diffusion flames to condensed-phase pyrolysis. Recently, his primary focus has been the development and deployment of open-source wildfire spread and risk modeling techniques, including real-time forecasting of active fires. *Speaker: "Simulations of WUI/Urban Conflagrations with the Landscape-Scale Fire Spread Simulator Called ELMFIRE"* *Wednesday, August 12, 11:20 – 11:40 am* We first review computational tools used for understanding and quantifying the fire risk in WUI/urban communities. We differentiate between: "building fire solvers" (and "building-cluster fire solvers") that are based on CFD and resolve indoor (outdoor) fire dynamics at single (multiple) building scales; and "urban conflagration solvers" that resolve outdoor fire dynamics at landscape/community scales. Conflagration solvers are used by practitioners to: quantify the fire risk; identify vulnerabilities; design new fire-resilience solutions; help optimize the emergency response; etc. We focus here on ELMFIRE and through ELMFIRE, review current challenges found in urban conflagration solvers: the uncertainties in the physical models that must work at coarse resolution; the uncertainties in the input data (vegetation, topography, building, and meteorological data); the scarcity of suitable validation data on fire dynamics. We also present illustrations of the current performance of ELMFIRE through reconstruction of a selection of past fire disasters in the US.

	**Christine Wiedinmyer, PhD** **University of Colorado, Boulder and University Corporation for Atmospheric Research (UCAR)** Dr. Christine Wiedinmyer has deep ties to UCAR and the U.S. National Science Foundation National Center for Atmospheric Research (NSF NCAR), which UCAR manages. She worked as an NSF NCAR scientist for 16 years and subsequently served on the UCAR Board of Trustees from 2019 until 20025, when she was named Director of UCAR Community Programs in 2025. She is the associate director for science at the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder, as well as a research professor at the university. She has developed a model to predict pollutant emissions from biomass burning, open waste burning and incomplete combustion sources. Dr. Wiedinmyer collaborates with others to investigate the impacts of these pollutant emissions, including air quality, climate and public health impacts. Her studies span from the local Front Range area to around the globe. *Panel #1 - Understanding the Impact of WUI Fires* *Tuesday, August 11 9:15 – 10:15 am*
	Daniel Gorham, PE **UL Research Institutes' Fire Safety Research Institute** Daniel is a research engineer for the Fire Safety Research Institute (FSRI), part of UL Research Institutes. His research interest includes understanding the natural hazard of wildfire and its impacts on society, particularly the structure ignition process and how to make homes and communities more resilient. Prior to joining FSRI Daniel worked as a research engineer at the Insurance Institute for Business & Home Safety (IBHS) where he led experimental work in the lab and in the field conducting post-fire investigations. He brings a wealth of fire science knowledge from his work experience at the National Fire

	Protection Association (NFPA) and the Fire Protection Research Foundation (FPRF). Daniel holds both a master's and bachelor's degree in fire protection engineering from the University of Maryland College Park. His master's work included time spent as a guest researcher at the USDA Forest Service' Missoula Fire Sciences Laboratory. In addition, his background as a firefighter/EMT help guide research on fire control measures, protecting firefighters, and code development to protect the public. He is a co-leader of the SFPE Foundation's WUI Working Group Research Module. *Moderator, Panel #3 - WUI Education for Engineers* *Wednesday, August 12, 1:15 – 2:00 pm* *Poster: Data Collection & Analysis Methodology for WUI Fires* Large wildland-urban interface fires can escalate rapidly from initial ignition to widespread conflagrations, as seen in recent incidents like the Camp, Marshall, Lahaina, Palisades, and Eaton Fires. These events often involve wind driven fire spread that overwhelms local response capabilities, with embers igniting spot fires far ahead of the main front. Understanding these fires is challenging but important to improve fire safety. Recent reviews by UL's Fire Safety Research Institute following the Lahaina, Palisades, and Eaton Fires rely on detailed spatiotemporal reconstruction, incorporating field assessments, responder location data, and geolocated images and videos collected across multiple jurisdictions. This methodology strengthens future efforts to analyze and learn from large scale WUI fire events.
	Daniel San Martin, PhD **University of California Berkeley** Dr. Daniel San Martin is a Postdoctoral Scholar in the Fire Research Lab at the University of California, Berkeley. He earned his Ph.D., Master's, and Bachelor's degrees in Computer Science and Engineering in Chile, where he established a career bridging scientific and high-performance computing with machine learning and advanced fire modeling.

With over a decade in academia, Dr. San Martin previously served as a Lecturer in computer programming, machine learning, and scientific computing. He is also an NVIDIA DLI Certified Instructor, qualified to lead technical workshops in GPU programming, data science, and deep learning. His current research focuses on numerical simulations of wildland-urban interface fires using operational and physics-based models. By integrating algorithmic development with scientific computing, Dr. San Martin seeks to enhance the computational frameworks critical for wildfire decision-making and large-scale risk assessment.

Poster: Accelerating Fire Exposure Reconstruction in WUI Fire Modeling via AI-Driven Surrogate Models

Traditional landscape-scale wildland-urban interface (WUI) fire models are essential for assessing community risk, but their high computational cost limits real-time deployment. This presentation introduces an artificial intelligence-driven surrogate model designed to overcome this critical bottleneck. By utilizing a U-Net Convolutional Neural Network (CNN) to emulate the semi-physics-based WUI model within the ELMFIRE simulation framework, the surrogate introduces a significant decrease in computational overhead. The AI model rapidly processes complex spatial inputs (such as building footprints, wind conditions, and heat release rates) to reconstruct transient direct flame contact and radiative heat flux fields. Achieving a 15x computational speedup while maintaining substantial predictive accuracy, this AI-driven approach significantly accelerates exposure characterization. This methodology effectively bridges the gap between detailed physics-based simulations and the speed required for large-scale, real-world engineering hazard forecasting and WUI risk mitigation.

Darlene Rini, PE, PhD Student
Jensen Hughes

Darlene is a Director in the Research, Development, Testing & Evaluation Division of Jensen Hughes out of Southern California, where she also leads the firm's Wildfire Risk Mitigation Global Service Line. With over 25 years of experience, she has established herself as an expert in structural fire engineering, wildfire resiliency, and community disaster preparedness. Her work focuses on developing holistic wildfire risk mitigation

strategies for urban and rural communities to support decision-making, policy development, and wildland-urban-interface risk management plans at various scales – building, parcel, enterprise, and city/county levels. This includes projects such as Community Wildfire Protection Plans (CWPPs), wildfire evacuation planning, utility wildfire mitigation plans, independent evaluator services and post-fire investigative studies.

Darlene is pursuing her PhD in Wildfire Resiliency and GISciences at the University of California, Santa Barbara, building on a solid academic foundation that includes multiple master's degrees in Fire Protection Engineering and Structural Engineering from top universities. Darlene actively contributes to various organizations, including the Ventura County Wildfire Collaborative and subject matter advisory roles to FEMA, SFPE, local fire departments, legal firms, etc.

Speaker: A Fire Engineering and Advanced Geospatial Analytics Approach to Wildfire Evacuation Planning
Tuesday, August 11, 5:15 – 5:35 pm

Wildfire evacuations in the wildland–urban interface (WUI) increasingly involve large populations, constrained road networks, and rapidly evolving fire behavior, yet there are few standardized methods for evaluating evacuation adequacy. This paper examines adapting fire engineering egress concepts, traditionally used for building fire safety, for wildfire evacuation planning at the neighborhood scale. This study evaluates prescriptive egress calculation methods (e.g., maximum travel distance, exit separation) and the Available Safe Egress Time versus Required Safe Egress Time framework (ASET vs. RSET) using geospatial analytics, agent-based modelling and fire spread simulation. Case studies from multiple WUI neighborhoods in California show that prescriptive proxies can efficiently identify evacuation deficiencies at low analytical cost. The use of performance-based analysis demonstrates that evacuation feasibility is highly sensitive to fire location, rate of spread and concurrent evacuation demand of several neighborhoods sharing limited road capacity. These findings suggest that traditional fire engineering approaches at the neighborhood-level alone may understate evacuation risk, but when combined with performance-based methods can provide a more robust and practical framework for wildfire evacuation planning.

	Poster: Beyond Technical Analysis - Lessons in Community and Stakeholder Engagement from a Regional Community Wildfire Protection Plan (CWPP) Recent wildfire events, including the 2020 Bobcat Fire, 2024 Bridge Fire, and 2025 Eaton Fire, affecting the San Gabriel Valley, have underscored the need for regional approaches to wildfire resilience that extend beyond technical analysis alone. This presentation draws from the development of a Regional Community Wildfire Protection Plan (CWPP) for the San Gabriel Valley Council of Governments (SGVCOG), highlighting how effective community and stakeholder engagement is essential to translating WUI fire engineering into meaningful action. While wildfire hazard and risk analyses provided the baseline foundation of the project, success depended on facilitation, risk communication, and coordination across multiple jurisdictions and stakeholder groups. Through a cohesive engagement process such as public workshops, stakeholder and technical advisory group coordination, the project team worked to make complex wildfire hazards and risk information accessible, credible, and actionable. The presentation shares lessons learned and practical strategies for fire protection engineers supporting community-scale wildfire resilience.
	Debadrita Das, PhD Candidate **University of Michigan** Debadrita Das is a third-year PhD candidate in the department of Civil and Environmental Engineering at University of Michigan. The primary focus of her research is applying numerical methods to simulate real-world natural hazard scenarios. She is currently working on modeling wildfire spread through firebrands using a coupled CFDEM approach. She was a 2023-2024 Michigan Institute for Computational Discovery & Engineering (MICDE) fellow. *Poster: Modeling Ignition of Recipient Fuels in the WUI using a Multisphere CFD-DEM Approach* The study of transport and deposition of firebrands is important to identify the regions in the Wildland Urban Interface (WUI) that are most susceptible to ignition during a wildfire.

	To investigate the fire spread at WUI, a Computational Fluid Dynamics (CFD) and Discrete Element Method (DEM) approach is adopted. The wind field for firebrand transport is modeled in CFD software OpenFOAM and the firebrands are modeled in DEM software LIGGGHTS. The irregular shape of firebrands is captured by the superquadric particle shape in DEM. Modeling firebrands as superquadric discrete element particles enables simulation of individual firebrand trajectories, interactions and post-contact kinematics. The proposed CFD-DEM framework for firebrand transport is validated against wind-tunnel experiments. Upon validation, the method is applied to investigate the effect of house morphology on firebrand accumulation patterns in the WUI, particularly the influence of orientation of structures with respect to the wind field and accumulation around vulnerable structural features.
	**Donna Settle, PE, PMSFPE** **Gallagher** Donna Settle, PE is a Property Risk Engineering Leader with more than 30 years of experience evaluating complex commercial occupancies and external exposures across manufacturing, logistics, cold storage, healthcare, education, and research environments. She specializes in translating technical fire protection and risk-engineering concepts into practical, defensible mitigation strategies for clients with large, diverse portfolios. Donna began her career as a facilities engineer in 1993 and has held engineering and risk consulting roles at Rockwell Space Operations, Factory Mutual Engineering (FM), Zurich, Marsh/Wortham, and now Gallagher. Her background spans property loss prevention, risk and exposure analysis, fire protection system evaluation, loss investigation, and civil-site considerations such as drainage and access, experience that informs her understanding of how external hazards, including those encountered in WUI environments, influence building vulnerability and emergency response effectiveness.

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<td>In her current role at Gallagher, Donna leads a national property risk engineering team and serves as a liaison between clients and carrier engineers to ensure alignment on risk priorities, capital planning, and program stability. She is a licensed Professional Engineer in Texas and an active member of SFPE, NFPA, NSPE, URMIA, and PRIMA.
Donna brings a practical, engineering-driven perspective to emerging risk challenges, including evolving WUI exposures and community-scale mitigation strategies.

Panel #2 - How Can Engineers Help Drive Better Decision-Making in WUI Communities?
Tuesday, August 11, 2:00 – 2:45 pm</td>
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<td>Elsa Pastor, PhD
Centre for Technological Risk Studies, Universitat Politècnica de Catalunya

Elsa Pastor, PhD, Associate Professor at the Chemical Engineering Department of Universitat Politècnica de Catalunya Barcelona and research scientist at the Center for Technological Risk Studies at UPC. She develops teaching and research activities in diverse fields related to wildfire management and technological risk analysis. Over the last 15 years, she has studied several aspects of fire behavior and dynamics by a multidisciplinary approach, combining both experimental and modeling techniques in a wide range of scenarios. She has profited from diverse fire environments (i.e. wildfires, wildfire research burning campaigns, outdoor large-scale industrial testing fields, compartment fires, laboratory set-ups, etc.) to observe monitor and analyze flames and their effect on different types of assets and ecosystems. She is currently leading the European Project WUIVIEW (wuiview.org), aimed at designing, setting-up and operating a virtual workbench service for the analysis of fire risk in the surroundings of buildings at the wildland-urban interface.

Panel #3 - WUI Education for Engineers
Wednesday, August 12, 1:15 – 2:00 pm</td>
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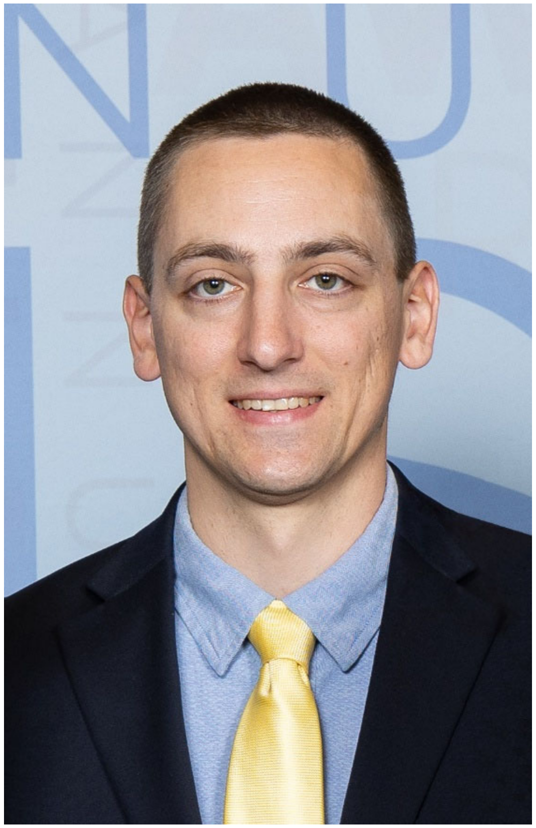


Eric Link, PhD
National Institute of Standards and Technology

Dr. Eric Link is a fire protection engineer in the WUI Fire Group in the Fire Research Division at the National Institute of Standards and Technology (NIST). Since joining NIST in 2017, his research has focused on a post-fire case study of the devastating Camp Fire that occurred in Butte County, California in 2018 (Paradise, CA). The goal of this research is to better understand WUI fire incidents in terms of incident development, fire spread and progression, emergency response, and structure performance, to identify approaches to help communities at risk of WUI fire become more prepared. Findings and lessons learned range from structure ignition vulnerabilities and community fire spread hazards to evacuation complications and critical life safety aspects of WUI fire incidents. Dr. Link has also contributed to experiments to quantify firebrand showers through the measurement and characterization of airborne firebrands, and the measurement of fire spread from parcel-level WUI fuels. Knowledge gained through case studies and experiments has supported information transfer and training to WUI communities and first responders, and the development of community mitigation and preparedness methods.

Dr. Link is a graduate of the University of Maryland, College Park (BS/MS FPE, PhD MechE).

Speaker: Evacuation Contingencies and Life Safety in WUI Fires
Tuesday, August 11, 5:35 – 5:55 pm

Existing communities are not built to construction standards that prevent them from burning. In practice, this reality necessitates widespread evacuations to get people out of the path of WUI fires. Several fires over the last decade were characterized by high-profile evacuations, tragic incidents resulting in dozens of fatalities, and terrifying accounts of dangerous scenarios when there is not enough time to evacuate before the fire arrives. The Camp Fire, which occurred in California in 2018, is one example. The widespread use of ad hoc temporary refuge areas and an understanding of the compressed timeline during the Camp Fire highlight possible advances in evacuation planning. Determination of the required evacuation time and specific contingency plans for what to do in

	scenarios when there is not enough time can help manage risk. In the future, FPEs will be called upon to develop and use decision-support tools and evacuation and sheltering strategies.
	**Erica Fischer, PhD, PE** **University of Oregon** Erica Fischer, PhD, PE is an Associate Professor of Civil and Construction Engineering at Oregon State University. Dr. Fischer's research interests revolve around innovative approaches to improve the resilience and robustness of structural systems affected by natural and man-made hazards. Dr. Fischer performs research on a variety of different structural systems including steel, timber (CLT), composites (concrete-CLT and steel-concrete), and thin shells subjected to hazards such as earthquakes and fires. She has participated in post-earthquake reconnaissance team missions in diverse regions including Haiti, Napa, California, Italy, and Mexico City; and led post-wildfire reconnaissance after the 2018 Camp Fire, 2021 Marshall Fire, and recently after the 2025 Eaton and Palisades Fires in LA. Dr. Fischer has experience as a practicing structural engineer and holds a Professional Engineering license in the states of Washington, California, and Oregon. She is co-leader of the SFPE Foundation's WUI Working Group Policy Module. *Panel #1 - Understanding the Impact of WUI Fires* *Tuesday, August 11, 9:15 – 10:15 am* *Panel #4 - WUI Working Group Module Updates* *Wednesday, August 12, 2:00 – 2:30 pm*

Esther Jose, PhD
Iowa State University

Esther Jose is an Assistant Professor in the Department of Industrial and Manufacturing Systems Engineering at Iowa State University. Her research develops decision-support methods that combine optimization, machine learning, geospatial analytics, and uncertainty quantification to improve decision making in complex, data-rich environments. Her work spans applications in natural hazards, particularly wildfire and prescribed fire planning, agriculture, and military and security, with an emphasis on translating advanced analytical methods into practical tools for real-world decision makers.

Dr. Jose's expertise includes mathematical optimization, information collection and sensor placement, geostatistics, spatial modeling, and remote sensing. She develops methods that integrate heterogeneous data sources, including satellite, airborne, and ground-based observations, to support decisions under uncertainty. Her research is supported by NSF and is performed in interdisciplinary collaborations with researchers, government agencies, and operational stakeholders.

Poster: A Spatial Decision Support Framework for Risk-Informed Prescribed Burning

Prescribed fire is one of the most effective tools for reducing wildfire risk in the wildland–urban interface (WUI), yet its implementation remains limited by uncertainty and community acceptance. This poster presents preliminary results from the NSF-funded RECAP (Robust, Efficient, and Community-Guided Framework for Smoke-Aware Prescribed Fire Planning in the WUl) project, focusing on two foundational components: a public perception survey examining attitudes toward prescribed fire and wildfire risk, and a probabilistic wildfire risk model that quantifies uncertainty in fire occurrence and impacts. We demonstrate how these complementary efforts provide the inputs needed for a decision-support framework that balances wildfire risk reduction with community preferences. The poster highlights early survey findings, the development of the risk modeling framework, and the role of operations research in integrating technical risk assessments with stakeholder values to support more informed and practical prescribed fire planning in WUI communities.

Evan Sluder
Insurance Institute for Business and Home Safety (IBHS)

Evan Sluder is an Engineer at the Insurance Institute of Business and Home Safety (IBHS), where his work focuses on wildfire science, building performance, and risk reduction strategies. His responsibilities include investigating fire behavior and building material performance under wildfire exposures, conducting post-fire analyses, and providing technical support for IBHS Wildfire Prepared Home and Wildfire Prepared Neighborhood programs.

In addition to his technical research, Evan contributes to IBHS efforts in research communication and public policy by translating complex fire science into actionable guidance for stakeholders, practitioners, and policymakers. His work helps bridge the gap between experimental research, field observations, and real-world implementation to improve wildfire resilience at the community and policy levels.

Evan holds a B.S. and an M.S. in Fire Protection Engineering from the University of Maryland, College Park.

Poster: Ignition Vulnerabilities at the Wall-Foundation Interface in Exterior Wall Fire Test Methods

Preventing structure ignition is a primary objective of wildfire mitigation due to the limited availability of firefighting resources. Exterior wall coverings and assemblies in the wildland-urban interface (WUI) are evaluated using test methods developed for compartment fire protection and life safety, which may not fully address ignition-driven vulnerabilities from external wildfire exposures.

This study evaluates the ability of SFM 12-7A-1 and ASTM E2707 to represent WUI fire exposures. Experiments conducted on exterior wall assemblies and coverings, including products listed by the California Office of the State Fire Marshal, with fire-resistance-rated and typical wall construction. Test modifications evaluated the specified thermal barrier at the wall-foundation connection and an alternative wind-driven mulch bed fire exposure.

	Results show that wall systems meeting current acceptance criteria may permit fire entry into wall cavities and exhibit surface flame spread, highlighting limitations in current test methods and supporting revised evaluation approaches to enhance structure survivability.
	**Fernando Raffan-Montoya, PhD** **University of Maryland, College Park** Fernando Raffan-Montoya holds a BS in Aerospace Engineering from the Florida Institute of Technology and an MS and PhD in Aerospace Engineering from the University of Maryland, College Park. After serving as post-doctoral scholar and faculty specialist, Dr. Raffan-Montoya joined the Department of Fire Protection Engineering at UMD in 2022 as Assistant Professor, where he teaches courses in fluid mechanics, heat transfer, experimental fire dynamics and wildland fire. His research interests include material flammability (particularly novel experimental methods), fire testing, wildland/WUI fires, and the use of advanced technologies (sensing, robotics) in FPE applications. Dr. Raffan-Montoya has also served the SFPE Foundation in several capacities including membership in the WUI Working Group and co-chairing the Climate Change Working Group. *Moderator, Panel #1 - Understanding the Impact of WUI Fires* *Tuesday, August 11, 9:15 – 10:15 am* *Panel #3 - WUI Education for Engineers* *Wednesday, August 12, 1:15 – 2:00 pm*
	Gabriela Calana Somoza, PhD Candidate **Stanford University** Gabriela Calana Somoza is a PhD candidate in Civil and Environmental Engineering at Stanford University. Her research focuses on developing regional-scale frameworks to quantify wildfire risk across California communities. She integrates ignition modeling,

	utility infrastructure, landscape and weather conditions, and building vulnerability to support fire-resilient planning and decision-making. Her work leverages data-driven statistical models to characterize different wildfire ignition mechanisms and assess their potential impacts under varying environmental and built conditions. Beyond her research, Gabriela has taught probabilistic models for civil engineering, mentors students, and helps lead the Stanford Urban Resilience Initiative, where she supports the development of educational and outreach activities for students and professionals working in risk and resilience. Prior to Stanford, she earned a Bachelor's degree in Civil Engineering from the University of Florida in 2022. As an undergraduate, she conducted research in structural optimization and completed internships in transportation, development services, and structural engineering. *Poster: Improving regional wildfire risk assessment frameworks by including the probability of ignition sources* In California, power-system equipment failures have been implicated in approximately 40% of the state's most destructive wildfires, yet regional ignition models that explicitly account for utility infrastructure remain limited. Moreover, existing wildfire risk frameworks rarely integrate ignition, spread, damage, and loss within a unified workflow. We describe a comprehensive regional wildfire risk framework that begins with ignition modeling for multiple ignition sources using parametric Poisson point process models that consider spatial and weather-related predictors of ignition. Outputs from the ignition models inform wildfire spread simulations under the same weather conditions as the ignition. The resulting damage to physical assets is quantified across the community to estimate expected losses. A case study analysis for Sonoma County, California, demonstrates the approach. This framework supports risk-informed mitigation strategies and improved assessment of potential liability from utility-related ignitions.
	Grayson Bellemy, Master's Student **University of Maryland, College Park** Grayson Bellamy is a graduate researcher in the Department of Fire Protection Engineering at the University of Maryland. His work focuses on the experimental

characterization and engineering modeling of material degradation processes relevant to fire safety, with particular emphasis on thermal decomposition, pyrolysis kinetics, and reduced-order modeling for large-scale fire simulations.

His research integrates laboratory-scale thermal analysis, inverse parameter estimation, and physics-based fire modeling to improve the reliability of material response predictions under fire exposure. Grayson's recent work has examined the robustness of semi-global pyrolysis models for lignocellulosic materials, with applications to wildland–urban interface fires, mass timber construction, and heterogeneous fuel assemblies. He has contributed to the development and evaluation of thermal decomposition models implemented in widely used engineering tools such as the Fire Dynamics Simulator (FDS).

Grayson's broader interests include fire exposure characterization, uncertainty-aware modeling, oxidative pyrolysis and smoldering, and the translation of fundamental material behavior into practical engineering guidance for risk assessment, standards development, and mitigation strategies in the built environment.

Poster: Assessing Reaction Mechanisms for Engineering Pyrolysis Models of WUI-Relevant Woody Fuels

Wildland-urban interface (WUI) fires expose vegetation and structures to highly variable thermal conditions, where the thermal decomposition of woody fuels strongly influences ignition, fire spread, and structural vulnerability. Engineering fire models used for WUI risk assessment rely on simplified pyrolysis representations, yet limited guidance exists on which reaction schemes provide reliable predictions under fire-relevant conditions. This work evaluates commonly used pyrolysis modeling approaches for woody fuels by comparing component-based (parallel) and lumped sequential reaction schemes using thermogravimetric data for Douglas fir and red oak. Models are calibrated and then tested against independent thermal histories not included in the optimization dataset. Results show that sequential reaction schemes provide more robust and transferable predictions than component-based models. These findings offer practical guidance for selecting pyrolysis models in WUI fire simulations, supporting improved parcel- and community-

	scale exposure assessment, risk modeling, and development of engineering-based mitigation strategies and standards.
	**Guowen Song, PhD** **Iowa State University** Dr. Guowen Song is an Associate Professor and Noma Scott Lloyd Chair in Textiles and Clothing at Iowa State University. His research focuses on functional textiles, protective clothing systems, thermal protection, clothing comfort, heat stress, and the development of testing devices and protocols for evaluating textile and apparel performance. He earned his Ph.D. in Textile Engineering, Chemistry, and Science from North Carolina State University, following M.S. and B.S. degrees in Textile Engineering and Chemistry from Tianjin Polytechnic University. Dr. Song has extensive experience in protective clothing performance evaluation, heat and moisture transfer modeling, instrumented manikin testing, 3D body scanning, and high-performance textile material development. His recent research also addresses firefighter smoke exposure, PPE contamination, and combustion-generated toxicants, including the development of controlled smoke testing methods, particle and PAH characterization, lithium-ion battery smoke emissions, passive sampler evaluation, and PPE decontamination efficiency. He has led and contributed to externally funded projects supporting next-generation firefighter PPE, contaminant protection, lithium-ion battery fire smoke hazard assessment, and silicone-based sampling technologies for firefighter chemical exposure evaluation. His scholarship includes peer-reviewed articles, books, book chapters, and invited presentations on protective clothing, firefighter safety, thermal protection *Poster: Controlled Characterization of Modern WUI Fire Smoke: Beyond PM2.5 Mass toward Size-Resolved Particle and Toxicant Assessment* This presentation introduces an engineering-based laboratory framework for controlled characterization of modern wildland–urban interface (WUI) fire smoke using A Controlled Consistent Exposure Simulation System (ACCESS). As WUI fires increasingly involve biomass, synthetic polymers, structural materials, vehicles, and lithium-ion battery

	components, smoke exposure cannot be adequately represented by biomass combustion or $PM_{2.5}$ mass alone. ACCESS enables controlled heat flux, oxygen supply, repeatable fuel geometry, smoke transport, real-time particle measurement, and size-resolved chemical sampling. The study evaluates a fuel-complexity gradient from biomass-only combustion to mixed-fuel and battery-involved scenarios, with emissions characterized by particle emission factors, particle number and mass distributions, trace metals, and 16 EPA priority PAHs. Findings highlight number–mass divergence, metal and PAH enrichment in exposure-relevant size fractions, and the limitations of $PM_{2.5}$-centered monitoring for assessing WUI smoke toxicity and firefighter exposure risk.
	**Hannah Gibbs, BASc, Master's Student** **University of Waterloo** Hannah Gibbs is a Master of Applied Science student at the University of Waterloo with the Fire Research Group. Her research broadly focusses on wildfire emissions, with an interest in examining trace heavy metals present in Canadian industrial areas. She also holds a Bachelor of Applied Science in Mechanical Engineering from the University of Waterloo and has 3 years of professional experience as a building code consultant. *Poster: Investigation into VOCs and Trace Metal Emissions from Wildfires Impacting Canadian Communities* As wildfire events become more prevalent and severe, there is an increased research interest into the human health effects of wildfire emissions. The proposed study aims to expand on previous wildfire research completed by the University of Waterloo Fire Research group by speciating and quantifying heavy metal and VOC concentrations in wildfire emissions. Representative samples of Ontario trees will be tested using the cone calorimeter and analyzed for the presence of VOCs and trace heavy metals in emissions by Fourier-transform infrared spectroscopy (FTIR) and inductively coupled plasma optical emission spectrometry (ICP-OES).

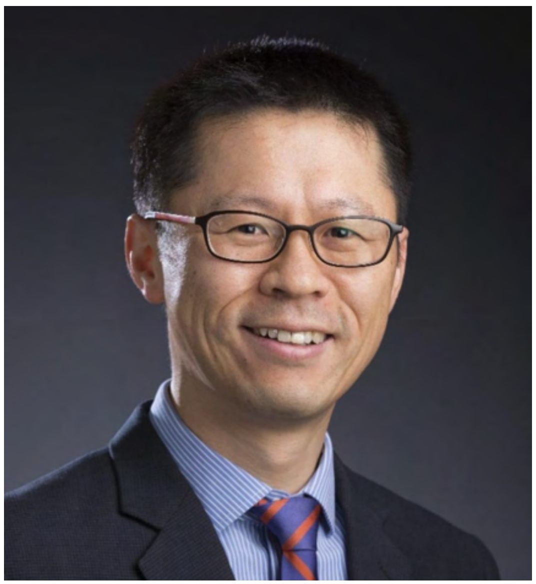
Hannah Odia, Undergraduate Student
University of Waterloo

Hannah Odia is an undergraduate Public Health student at the University of Waterloo, focusing her research on fire emergency egress, occupational fire safety, and wildfire risk management. As a Research Assistant under Dr. Elizabeth Weckman at the University of Waterloo's Fire Research Lab, she supports both the development and implementation of lab projects by contributing a health-based perspective. Her main work centers on the WUI Fire Safety in Canadian Indigenous Communities project, a collaboration with the National Indigenous Fire Safety Council, where she leads qualitative research analysis and applies statistical modeling to create interdisciplinary risk indices. Hannah is also pursuing a minor in Addictions, Mental Health, and Policy, strengthening her commitment to wildfire risk management solutions that incorporate socio-economic variables alongside technical risk factors.

Poster: Reimagining Wildfire Risk Frameworks: A Dynamic Approach to Fire Risk Prediction in Indigenous WUI Communities Across Canada

Wildfire mitigation and prevention are highly prevalent issues given the acceleration of climate change globally. Wildfire risk is managed using an amalgamation of methodologies and tools derived from a Western worldview. However, the current strategies used within wildfire risk management have failed to reflect the population and geographic diversity across Canada. Indigenous communities experience wildfire evacuation events at a rate much higher than non-Indigenous population. Moreover, there is a wide breath of knowledge held within Indigenous communities which should be foundation of Indigenous led wildfire management. This poster used an interdisciplinary approach to blend technical wildfire risk factors, such as topography and vegetation, with population level sociodemographic variables. Consequently, a novel set of principles was proposed to enhance wildfire risk understanding and assessment across the field of wildfire management. These principles will assist in reorienting non-Indigenous researchers toward improvements in Indigenous wildfire risk assessment and decision-making.

<table>
<tr><td></td><td>Student Pitch: Development of a Framework to Guide Use of Vegetation in Wildfire Resilient Communities

Canada's plants have been surviving wildfires for thousands of years. This project asks: what can we learn from them? By testing several species from major vegetation regions, a Fire Performance Index will be developed to classify plants by their fire behaviour – including classifications of resiliency. Combined with Indigenous knowledge and regional fire case studies, findings will inform a Wildland-Urban Interface framework that puts the right plants in the right places, turning ecological resilience into a practical tool for community fire risk reduction.</td></tr>
<tr><td></td><td>Haejun Park, PhD, PE
Oklahoma State University

Dr. Haejun Park is an Associate Professor in the Fire Protection and Safety Engineering Technology program at Oklahoma State University. Prior to joining OSU, he worked as a Fire Safety Engineer in Melbourne, Australia, and as a Fire Research Engineer in Wellington, New Zealand.

At OSU, he teaches Fire Dynamics, Industrial Ventilation and Smoke Control, and Fire and Evacuation Modeling. His research interests include fire risk assessment methodologies as well as experimental and computational modeling studies.

Poster: Development of a Community-Specific WUI Fire Resilience Assessment Model

Numerous efforts have been undertaken to improve resilience to wildland–urban interface (WUI) fires; however, the effectiveness and efficiency of these measures remain difficult to quantify. This challenge arises in part because WUI fire outcomes are governed by a wide range of interconnected performance attributes, making comprehensive resilience assessment highly complex. Furthermore, each WUI community exhibits unique characteristics across these attributes, complicating the selection of appropriate mitigation strategies. In this study, we developed two performance-based WUI fire resilience assessment models through the systematic anatomization of both regulatory codes and documented WUI fire outcomes into detailed performance attributes related</td></tr>
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	to wildfire behavior, structural vulnerability, and human/community factors. These attributes and their interdependencies are organized across the four emergency management phases: mitigation, preparedness, response, and recovery. The resulting framework enables structured comparisons across communities with differing safety conditions and supports the development of tailored resilience strategies for WUI fire risk reduction. *Poster: Formation and Visualization of Wildfire-Induced Soil Water Repellency in Laboratory-Scale Experiments* Soil water repellency (SWR) arises from hydrophobic-layer formation that reduces the soil's ability to absorb water, accelerating rainfall conversion to surface runoff and increasing risks of erosion and flooding. Wildfire is a particularly strong driver of SWR, enhancing both the persistence and severity of soil hydrophobicity. However, many studies rely on muffle-furnace heating under uniform, isothermal conditions that fail to represent the steep temperature gradients and spatially heterogeneous heating produced during wildfires. To better capture wildfire-relevant processes and link microscale wettability changes to macroscale hydrologic responses, this study will develop an experimental framework that complements conventional approaches. It will evaluate top-down heating–induced temperature gradients and associated heat-driven transport, the influence of soil organic matter on hydrophobic-layer depth and continuity, and the role of initial soil moisture in controlling formation thresholds and post-heating stability. This approach will advance mechanistic understanding and improve predictions of post-wildfire runoff and soil erosion hazards.

Hamed Salehi, PE
Holmes

Hamed Salehi is a Registered Fire Protection Engineer in California, Oregon, and Washington, and a Senior Fire Engineer at Holmes US, where he provides fire life safety consulting across a broad range of projects. He serves as President of the Northern California-Nevada Chapter of the Society of Fire Protection Engineers (NCN-SFPE), working to support the growth of the profession and connect fire protection engineers across the region. Hamed also serves as an adjunct lecturer at the University of Maryland, where he is passionate about contributing to the education and development of future fire protection engineers.

He is co-leader of the SFPE Foundation's WUI Working Group Policy Module.

Moderator: Student Pitch Competition
Tuesday, August 11, 12:00 – 12:30 pm and Wednesday, August 12, 12:10 – 12:15 pm

Haseeb Kazmi, MSc, PhD Student
Centre for Technological Risk Studies, Universitat Politècnica de Catalunya

Haseeb Kazmi is a PhD student at the Centre d'Estudis del Risc Tecnològic (CERTEC), Universitat Politècnica de Catalunya (UPC), researching how Wildland–Urban Interface (WUI) communities can better prepare for and respond to wildfires. His work focuses on risk-based, multi-scale assessments that support civil protection planning, evacuation feasibility, and community resilience. His research examines how fire behaviour, settlement layout, vegetation–asset interaction, and road accessibility influence emergency response options, using map-based analysis and fire engineering principles. He holds an International Master of Science in Fire Safety Engineering (IMFSE) and has experience in fire engineering consultancy, experimental fire research, computational modelling, and the chemical manufacturing industry.

Speaker: Fire Risk Assessment of WUI Communities Based on Internal Settlement Characteristics
Tuesday, August 11, 2:45 – 3:05 pm

	WUI communities can cope with wildfires. The approach uses a set of quantitative, map-based indicators to evaluate key internal characteristics of WUI settlements that influence evacuation and shelter-in-place strategies. These include potential fire behavior within the settlement, settlement size, vegetation–asset interaction, the presence of vulnerable infrastructure, and road accessibility for residents and emergency vehicles. The methodology is applied to close to 500 WUI settlements in Catalonia (Spain), providing a comparative, operational overview of where evacuation may be constrained, shelter-in-place strategies may be challenging, and where targeted mitigation measures could improve preparedness and resilience.
	**James Urban, PhD** **Worcester Polytechnic Institute** Dr. Urban is an Assistant Professor in the Department of Fire Protection Engineering. His area of active research includes developing sensors and detectors for wildland and wildland-urban interface fires, computational modelling, experiments of the ignition and burning of wildland and manufactured materials and using flow visualization and computer vision techniques to measure fire and combustion phenomena. He is a co-leader of the SFPE Foundation's WUI Working Group Research Module. *Panel #4 - WUI Working Group Module Updates* *Wednesday, August 12, 2:00 – 2:30 pm*

Janice Coen, PhD
National Center for Atmospheric Research (NCAR)

Dr. Janice Coen is an atmospheric scientist specializing in computational fluid dynamics, fire behavior modeling, and infrared imagery analysis. She holds a PhD and M.S. from the University of Chicago's Department of Geophysical Sciences and a B.S. in Engineering Physics from Grove City College. Currently serving as Visiting Scholar at the University of San Francisco and Project Scientist at the NSF National Center for Atmospheric Research, she has developed two coupled numerical weather prediction-wildland fire behavior models and pioneered forecast methodologies integrating active fire detection data. Her research spans over 40 wildland fire events, 20 interdisciplinary sponsored research projects, and includes consulting in wildfire litigation and regulatory proceedings. She currently serves as a judge for the XPrize Wildfire competition.

Poster: Non-Classical Exposure Pathways in Terrain-Adjacent WUI Communities

WUI fire engineering methods commonly characterize exposure using parcel-centric assumptions of laterally uniform wind and edge-driven fire spread. Evidence from recent fires shows that these assumptions can fail in terrain-influenced communities, where stable stratification and terrain-following flow redirect fire spread and exposure at neighborhood scales. When these mechanisms are overlooked, parcel-level mitigation guidance and community risk assessments can misrepresent structure-relevant hazard.

This work examines exposure conditions in representative WUI communities using coupled weather–fire simulations and post-fire reconstruction at 100–300 m scales. Near-surface wind structure, fire spread, and exposure are analyzed in relation to terrain and community features such as greenways, drainage corridors, and open-space networks. Results show that stable, terrain-hugging flow can concentrate fire spread and ember transport into low-lying community corridors, allowing fire to penetrate well beyond expected exposure zones. These pathways are spatially localized and transient, yet they strongly influence ignition sequencing and damage patterns. An exposure-regime perspective is proposed to better bound these hazards for parcel risk assessment and community-scale planning.

Jason Smart, PE, MSCE
American Wood Council

Jason Smart is the Senior Director of Fire Engineering at the American Wood Council (AWC). Since joining AWC in 2013, Jason has led numerous projects related to fire safety and acoustical performance of wood construction. He serves on numerous consensus committees which promulgate referenced standards and is also active in development of model building codes. During the development of the U.S. mass timber code provisions, he provided technical support to the ICC Ad-Hoc Committee on Tall Wood Buildings and to the applicable code development committees regarding the development and execution of multiple fire test series which were deemed necessary to justify ICC code change proposals.

Prior to joining AWC, Jason worked for the International Code Council Evaluation Service (ICC-ES), where he evaluated a variety of building products, including wood products and related components and systems, for equivalency and compliance with U.S. model building code provisions. He also worked at the Institute for Business & Home Safety (IBHS) as a Project Engineer / Building Code Specialist prior to his tenure at ICC-ES. Jason is a licensed professional engineer and a graduate of Virginia Tech with a bachelor's degree Wood Science and Forest Products and a master's degree in Civil Engineering

Speaker: A Test-Based Approach to Assessment of WUI Fire Hardening on Walls and Soffits
Tuesday, August 10, 10:45 – 11:05 am

Where defensible space around a building is inadequate, hardening of the building envelope should address the potential for exposure to direct flame impingement. In order to study potential entry points for fire and identify exterior wall and soffit configurations that best minimize the risk of structure loss due to direct flame impingement in a WUI fire exposure, two series of WUI fire tests were performed. Details of the test assemblies are provided, along with heat flux and temperature measurements at various layer interfaces within the tested assemblies and an explanation of how the findings from these tests are being applied to help mitigate against wildfire losses in the WUI.

	**Jeannette Sutton, PhD** **The Warn Room** Jeannette Sutton, PhD, is an internationally recognized scholar of alerts and warnings. With funding from the National Science Foundation, the National Oceanic and Atmospheric Administration, the US Geological Survey, and the Federal Emergency Management Agency, she has studied, taught, and written about risk communication, alerts, and warnings for more than two decades. Her extensive expertise has led to consultation and speaking engagements domestically and around the world. Sutton has consulted with Federal, state, and local organizations and contributed to international research and training. In addition to work with public sector emergency management and public safety organizations, she has consulted to the US Fire Administration (wildfire), the National Center for Missing and Exploited Children (AMBER and Missing Person alerts), 911 Call Dispatchers, and University and College Campuses. She works as an Associate Professor at the University at Albany. In 2024, Sutton launched *The Warn Room* to bring evidence-based research to practitioners by translating the science into practice. In this capacity, she conducts audits of historical alert and warning messages and reviews templates designed for future communication. Most recently, she became a co-host of *The Alerting Authority*; the only podcast focused entirely on alerts and warnings. *Keynote #3 - Why WUI Fire Engineering Needs Social Scientists* *Tuesday, August 11, 4:30 – 5:15 pm*
	Jiwon Baik, PhD **Jensen Hughes** Jiwon Baik is a spatial data scientist specializing in wildfire risk mitigation, fire safety analytics, and AI-driven spatial decision support. She holds a PhD in Spatial Data Science and currently works as a Technical Professional in the Wildfire Risk Mitigation group at Jensen Hughes, where she supports large-scale wildfire risk assessments, fire code–

informed access evaluations, and infrastructure planning efforts for public agencies and electric utilities.

Dr. Baik's work focuses on developing scalable, data-driven, and AI-enabled methods to evaluate access, exposure, and vulnerability in complex urban and wildland–urban interface (WUI) environments. Her research integrates geographic information science (GIS), spatial optimization, and deep learning to advance risk-informed decision-making in fire safety and wildfire resilience. She has led the development of automated geospatial workflows for hydrant coverage assessment, hydrant-to-structure access evaluation, and fine-resolution regional wildfire risk mapping, enabling consistent and defensible analyses at jurisdiction-wide scales.

Poster: Quantifying Worst Case Fire Access: A Big Data Framework for Assessing the Compliance of Fire Code Structure Access

Fire codes require that all portions of a building exterior be accessible from fire apparatus and hydrants within a prescribed distance along an unobstructed route. In practice, this requirement is typically evaluated during plan review using manual or computer-based measurements in construction or permitting drawing sets. However, in research where access is assessed for jurisdiction-wide inventories, existing building stock, or wildfire risk planning, data-driven approaches commonly rely on straight-line distance evaluation. This presentation introduces a big-data–driven spatial framework for evaluating fire personnel and fire apparatus access to building perimeters. The approach identifies the travel distance from all hydrants and fire access roads to the furthest point along the exterior of a building, accounting for obstacles such as buildings, parcel boundaries, and other barriers. Using a large-scale application across Santa Barbara County, California, the presentation demonstrates how building-scale hydrant and fire road access requirements can be applied at City or County scale to help identify deficiencies in coverage and help inform infrastructure or operational improvements for fire or wildfire safety at scale.

Joe Hart, BSc (Hons), MSc, MIET, MIFireE, MSFPE, MIoL, AMEI
Delta Fire Engineering

An experienced engineer and academic, Joe Hart is Head of Delta Research and Development. Joe has extensive experience in developing fire strategies for buildings across the UK and specialises in the development of performance-based design solutions. Between 2021 - 2024 he held a part-time lecturer position at the University of Central Lancashire before setting up Delta Fire Training Ltd, a dedicated fire training business based in the UK. Within the Delta Innovation Group Joe is responsible for building the business and all day-to-day Operations, as well as working closely with clients to achieve their fire safety goals.

Poster: Field-Based Mapping and Characterisation of Urban and Peri-Urban Vegetation for Wildfire Mitigation in Los Angeles

This paper presents a field-based study conducted in Los Angeles aimed at mapping urban and peri-urban foliage to support wildfire mitigation efforts. The research focuses on identifying and documenting tree species located within designated wildfire zones, with attention to their physical characteristics and ignition potential. Fieldwork methods include on-site vegetation surveys, with geospatial mapping using satellite data, and species classification. The study provides a descriptive inventory of dominant and recurring tree species, analysing traits such as leaf structure, moisture content, bark characteristics, and fuel load density that influence flammability and fire behaviour. By linking species composition to wildfire risk, this research contributes localised ecological data that informs vegetation management, urban planning, and fire prevention strategies. The findings aim to support policymakers, land managers, and emergency planners in reducing wildfire vulnerability through evidence-based foliage assessment and mitigation planning, and draws on Delta Fire Engineering’s first-hand experience in the 2025 Palisades fire.

	Poster: The Burgum–Hart Tunnel: A New Experimental Platform for Firebrand Generation and Transport Studies This study presents a new experimental apparatus, the Burgum–Hart Tunnel, designed to investigate the production and behaviour of burning brands under forced airflow. The apparatus consists of a 2.4m enclosed tunnel in which a fan-driven flow is applied to a burning fuel load, entraining and propelling released brands. Experiments were conducted to observe brand release dynamics, transport behaviour, and survivability under repeatable flow conditions. The Burgum–Hart Tunnel enables controlled variation of airflow and fuel characteristics, providing a reproducible platform for studying firebrand generation. Results demonstrate that the apparatus can reliably produce burning brands representative of those observed in wildland and wildland–urban interface fires. This work introduces a novel experimental tool that improves understanding of firebrand-driven fire spread and supports development of more accurate predictive models. The work is influenced by Delta Fire Engineering's first-hand experience at the 2025 Palisades fire in Los Angeles and subsequent fieldwork.
	**Jorge Valdivia, PhD Candidate** **Worcester Polytechnic Institute** Jorge Valdivia is a Ph.D. candidate in Fire Protection Engineering at Worcester Polytechnic Institute (WPI), working under the supervision of Prof. James L. Urban. His doctoral research focuses on the development of engineering tools for exposure analysis in wildland-urban interface (WUI) fires, using combined experimental and computational approaches. His work includes the design, operation, and characterization of experimental facilities such as the Convective Ignition Facility (CIF) and the Convective-Radiative Ignition Facility (CRIF), which enable controlled studies of convective and radiative heating relevant to ignition and fire spread. His research also includes radiative heat transfer analysis using standard fire testing methods, physics-based modeling of heat transfer and pyrolysis, and experimental studies of vegetation ignition and flame spread.

	His work has resulted in peer-reviewed publications in fire science journals and presentations at technical conferences, including NFPA and the U.S. National Combustion Meeting. He also serves as President of the WPI SFPE Student Chapter for 2025-2026. *Poster: Ignition of wood by convection and radiation heating* Wooden dowels were exposed to controlled combinations of forced convection and incident radiation using a convective-radiative ignition facility to examine flaming ignition under coupled thermal exposure. White oak dowels of three diameters were tested over a range of gas temperatures, flow conditions, and radiative heat fluxes. Ignition outcomes were analyzed using pseudo incoming heat flux, energy dose, heating-mode classification, and logistic regression in a combined radiative-convective parameter space. A two-dimensional polar pyrolysis model was also used to examine thermal degradation, char formation, and internal temperature evolution around the dowel cross section. Results showed that flaming ignition was governed by the coupled influence of gas temperature, convection, radiation, and diameter, rather than by a single imposed variable. Glowing combustion preceded all flaming ignition cases, suggesting that oxygen transport and char oxidation helped control the transition from glowing to flaming ignition.
	Joseph Willi **UL Research Institutes' Fire Safety Research Institute** Joseph Willi is a research engineer with UL Research Institutes' Fire Safety Research Institute. Since joining the team in 2017, he has been a main contributor to research projects regarding live-fire training, fire investigation, fire modeling, and fires in the wildland-urban interface (WUI). His current research is focused on better understanding mechanisms of structure-to-structure fire spread during WUI fire incidents. Joseph holds a B.S. in General Engineering from the University of Illinois at Urbana-Champaign and an M.S. in Fire Protection Engineering from the University of Maryland, College Park. *Speaker: Window Failure During Exterior Fire Exposure* *Tuesday, August 11 11:05 – 11:25 am*

	Structure-to-structure fire spread has been identified as a contributing factor to the devastating amounts of structure loss encountered during wildfire-initiated urban conflagration events. Windows are one potential vulnerability of structures during exterior fire exposures, such as that from an adjacent structure fire. UL Research Institutes' Fire Safety Research Institute has conducted numerous series of experiments to study window failure during exterior fire exposure. Specifically, the research has focused on examining the failure of both window pane and window frame assemblies during exterior fire exposure as well as evaluating different methods for protecting windows from an exterior fire exposure. This presentation will provide an overview of the methodology used during these experimental series, describe key findings from the research, and discuss how the results can be utilized to improve building codes, standards, and homeowner guidance documents for communities prone to WUI fire hazards.
	Jun Meng, PhD **Washington State University** Dr. Jun Meng is an Assistant Professor in the Department of Civil and Environmental Engineering at Washington State University. He received his Ph.D. in Atmospheric Science from Dalhousie University and completed postdoctoral training at UCLA. His research focuses on air quality modeling, with an emphasis on PM2.5 and the chemical composition of atmospheric pollutants, using advanced chemical transport models such as CMAQ and GEOS-Chem. A central theme of his work is improving the representation of wildfire smoke emissions and atmospheric processing to better support public health assessments and environmental decision-making. More broadly, Dr. Meng's research connects atmospheric chemistry, climate variability, and emerging air pollutants, with a particular interest in how changing fire regimes influence regional and global air quality.

Poster: Modeling Ambient Polycyclic Aromatic Hydrocarbon (PAH) from Fires over North America

Polycyclic aromatic hydrocarbons (PAHs) are toxic pollutants with significant health risks, yet their sources and atmospheric burdens remain uncertain, particularly under an evolving wildfire regime. In this study, we develop an wildfire PAH emission inventory by integrating multiple global fire emission datasets with land cover–specific emission factors, and implement it in the GEOS-Chem chemical transport model over North America for 2009–2021. Model evaluation shows improved agreement with surface observations and highlights the importance of high spatial resolution in resolving wildfire-driven pollution. Results indicate that wildfires dominate summertime PAH levels in western North America and are an increasingly important contributor to regional cancer risk. As future work, we will develop wildland urban interface (WUI)–specific emission factors to better represent mixed combustion of vegetation and built materials. This work advances understanding of fire-driven air pollution and improves tools for assessing air quality and public health impacts under a changing climate.

Justin W Bonny, PhD
Morgan State University

Justin W. Bonny, Ph.D., is an Associate Professor in the Department of Psychology at Morgan State University. He earned his Ph.D. in Psychology with a concentration in Cognition and Development from Emory University. Dr. Bonny's research investigates the intersection of cognitive psychology and human behavior in fire, focusing on how individuals perceive and respond to fire emergencies. His work explores the human perception of developing fires, examining how factors like smoke, flame cues, and alarm system alerts impact risk assessment and the decision to engage in protective action. Dr. Bonny employs research methods and technologies, including Extended Reality (XR) and Virtual Reality (VR), to create immersive, simulated residential fire scenarios that experimentally measure human behavior and decision-making. His research in human behavior and cognition has been supported by the National Science Foundation and the U.S. Army Research Institute for the Behavioral and Social Sciences. Dr. Bonny has

	published extensively in peer-reviewed journals such as Behavior Research Methods, Safety, and Fire and Materials. Through his interdisciplinary approach, he aims to improve the understanding of human behavior in fire incidents to inform system design, training, and education. *Poster: Development of the Wildfire Alert Situation Awareness (WASA) Questionnaire* During wildland-urban interface (WUI) fires, ambiguous emergency alerts can delay resident evacuations. Human factors research indicates that situation awareness (SA), perceiving information, understanding the current context, and predicting future states, may contribute to this. The lack of clear information in alerts can prevent residents from understanding and predicting hazard impacts. To address this, we developed the Wildfire Alert Situation Awareness (WASA) questionnaire. In an experimental study, participants viewed simulated alerts varying in text length (90 vs. 360 characters) and multimodal content (maps/imagery). Psychometric analyses validated the WASA, with connections between alert design, SA, hazard perception, and trust. This research provides empirical evidence that specific alert structures directly influence resident comprehension. The WASA provides a tool for assessing SA in the testing and development of next-generation emergency communications to optimize alerting strategies and improve public safety.
	Kara Noland, MEng **Stellenbosch University** Kara Annelize van Heerden Noland holds a BEng and MEng degree in Civil Engineering from Stellenbosch University, which she obtained in 2023 and 2025. She is a South African citizen and was introduced to the field of Fire Engineering through one of her professors during her undergraduate studies, Prof. Richard Walls. She decided to pursue her Master's in this field, and while contemplating her research focus, Prof. Walls recommended that she speak with his colleague, Dr. Natalia Flores-Quiroz, who specialises in human behaviour in fire engineering. After their meeting, Kara was excited about the proposed research and its potential contributions to the global understanding

	of HBiF. The supervisor for her master's project was Dr. Natalia Flores-Quiroz, the co-head of the Fire Engineering Research Unit at Stellenbosch University (FireSUN). FireSUN is advancing fire safety engineering in Africa by cultivating a committed team of researchers and developing postgraduate programs. *Poster: Understanding Human Behaviour in Wildland-Urban Interface Fires: A South African Case Study Using Reflexive Thematic Analysis* Wildland-urban interface (WUI) fires, where natural land meets human development, have gained significant attention. These areas, extending up to a kilometre from communities, face heightened wildfire risks, intensified by climate change. Such threats endanger WUI residents, potentially leading to injuries and fatalities. This presentation shares the results of a project that examined human behaviour during the 2017 Knysna fire, a well-documented South African event. By analysing testimonies from the Knysna Fire Stories book and conducting interviews, the project identified factors influencing behaviour in WUI fires and contributed to understanding human responses in this context. The findings provide insights to inform evacuation procedures and safety measures, ultimately aiming to improve protection for vulnerable communities.
	Katherine Burgum MEng, AIFireE, AIoL **Delta Fire Engineering** Katherine Burgum is a Senior Fire Engineer at Delta Fire Engineering Ltd. Katherine has recently graduated the University of Central Lancashire with an MEng in Fire Engineering. For her undergraduate and postgraduate dissertations, Katherine focused on an experimental study into wildfire mitigation strategies to be used in the UK. Katherine presented her poster 'An experimental study into the use of fuel breaks as a mitigation method for wildfires in the UK' at the 14th International Symposium on Fire Safety Science in Tsukuba, Japan in 2023 and has a strong interest in the behaviour of wildfires and the effect they can have on people, property, and the environment. Along side working at Delta, Katherine is the Vice President of the Yorkshire and Humberside Branch at the Institution of Fire Engineers where she collaborates and assists with the planning of events and promotion of the branch.

Poster: Field-Based Mapping and Characterisation of Urban and Peri-Urban Vegetation for Wildfire Mitigation in Los Angeles

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<td>Kimiko Barrett, PhD
Alliance for Wildfire Resilience

Kimi is a committed agent of change in how we live with inevitable wildfires. Drawing on the expertise within the broad networks she has built, she has led research of national significance on topical issues such as the true cost of wildfires, the cost of building wildfire-resistant homes, and measuring wildfire impacts through structure loss. Her work has changed the national wildfire narrative and shaped new strategies for engaging communities on wildfire resilience.

Before joining the Alliance for Wildfire Resilience, Kimi managed Headwaters Economics' Community Planning Assistance for Wildfire program for several years. In that capacity she worked with firefighters, land use and planning staff, government agency personnel, and elected officials in more than 80 communities across the country, helping them devise community-driven solutions to reduce wildfire risk and increase community adaptation efforts. Kimi's experience with local-level efforts ensures that her research and policy work addresses real problems on the ground.

Panel #1 - Understanding the Impact of WUI Fires
Tuesday, August 10, 9:15- 10:15 am</td>
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<td>Krzysztof Munko, PhD Student
The University of Edinburgh

A First Year PhD student in fire safety engineering at the University of Edinburgh, Krzysztof Munko's research primarily focuses on the spread of WUI fires, with a particular interest in firebrand transport and ignition due to ember accumulation. He is currently President of the SFPE Edinburgh Student Chapter and a Student Representative for the SFPE UK Chapter. As a graduate of the Structural and Fire Safety Engineering programme from the University of Edinburgh, his overall professional experience spans fire science, fire safety engineering, structural engineering and materials science, combining academic research</td>
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	with practical industry experience gained through both UK-based and international fire engineering projects. *Poster: Quantifying the effects of variability in firebrand deposition on pile burning and heat transfer processes* During a WUI ember attack, firebrands can accumulate, creating spot ignitions on combustible materials. This study investigates how variability in firebrand deposition affects pile-burning behaviour and subsequent heat transfer to the substrate, with an emphasis on spatial heterogeneity and ignition risk. Cylindrical wooden dowels (50 mm × 4 mm) were heated to 400°C and deposited onto a vermiculite bed. A total of 250 g was pyrolysed for 11 minutes and then manually deposited. Temperatures were measured using type-K thermocouples at depths of 5, 10, and 15 mm, with 28 sensors distributed across and above the substrate. Eleven experiments showed variability in burning behaviour and temperature distribution over the substrate surface. Heat flux analysis, together with statistical methods, was used to relate heating patterns to observed burning characteristics. This novel approach can reduce the time and resources invested in characterising firebrand exposure while ensuring reliable data and an acceptable level of uncertainty in the results.

Kuldeep Prasad, PhD
National Institute of Standards and Technology

Dr. Kuldeep R. Prasad is a mechanical engineer in the Engineered Fire Safety Group of the Fire Research Division (FRD) of the Engineering Laboratory (EL) at the National Institute of Standards and Technology (NIST). Dr. Prasad develops mathematical and numerical models for simulating complex multi-dimensional, multi-phase chemically reacting fluid flows. His research interests include numerical simulation of chemically reacting fluid flows with detailed finite rate kinetics, mathematical and numerical modeling of various physical and chemical processes and large-scale computing using DNS or LES models. He has also developed expertise in using finite element methods for heat transfer and coupling of fire models with structural analysis software.

His efforts at NIST has focused on development of multiblock grid embedding models using the domain decomposition techniques, development of the fire-structure interface (FSI) as part of the NIST technical investigation into the collapse of the World Trade Center Towers, development of analytical models for hydrogen release and dispersion in partially enclosed compartments, mathematical modeling of heat and mass transfer through fire fighter protective clothing and numerical simulation of flame spread over cellulosic materials in microgravity.

Poster: Understanding Dynamics of Grassland Fires using Physics-based Models

We investigate the application of full-physics-based model, the Fire Dynamics Simulator (FDS), to understand coupling of spread rate with local atmospheric conditions and predict evolution of wildland fire fronts. Simulation results for various ignition line lengths and ambient wind speeds capture the relationship between spread rate and fire width and compared favorably with empirical formulas available in the literature. We investigate the role of Byrams' Convective Number and elucidate the physical processes that result in different fire perimeter shapes under low or high wind conditions.

Leslie Marshall, PhD
SFPE Foundation

Leslie Marshall, PhD is Executive Director of the SFPE Foundation, a global non-profit organization affiliated with the Society of Fire Protection Engineers that supports research and education to improve the scientific understanding of fire and its interaction with the social, natural, and built environments. Dr. Marshall oversees all Foundation programs: facilitating professional awards, student scholarships, and research grants; leading cross-sectoral research collaborations; conducting research workshops and meetings; developing initiatives to support the next generation of fire protection engineers; and disseminating knowledge to advance the field of fire engineering and fire safety science. An affiliate of the Economic and Social Rights Research Group of the University of Connecticut's Human Rights Institute, Dr. Marshall has published multiple policy reports and academic journal articles and frequently speaks on emerging fire safety challenges, resilience and sustainability, economic development, and energy infrastructure and workforce transition. She has consulted for the United Nations Development Programme, Innovations for Poverty Action, the Centre for Women in Governance, and the Lebanese Center for Policy Studies, among others.

Co-Host & Event Moderator

Opening Remarks
Tuesday, August 11 8:30 – 8:45 am

Closing Panel #5 - Creating the Infrastructure for WUI Fire Engineering Research and Collaboration.
Wednesday, August 12, 4:30 – 5:00 pm

Liora Mervis
Jensen Hughes

Liora is an associate fire protection engineer graduating with a Master of Engineering degree from the University of Maryland. During her time at Jensen Hughes, Liora has supported fire modeling analyses in the development of fire hazards and fire risk

assessments. She has served as a subject matter expert to review wildfire mitigation plans for utilities, while documenting current utility industry approaches to modeling wildfire risk. She has also completed work for the development of fire probabilistic risk assessments (FPRAs) for multiple nuclear power plants.

Poster: Reducing Community Wildfire Risk Through Development of Utility Mitigation Plans

In some states, electric utilities are required to develop plans to minimize the potential for wildfire ignition due to their assets. These plans are often documented in the form of "wildfire mitigation plans", which are technical documents that utilize risk assessment, modeling and empirical techniques to identify vulnerabilities, assess consequences and prioritize areas of improvement. This presentation will summarize some of the technical approaches implemented in developing these wildfire mitigation plans as well as describe the terminology often used in this engineering field. This information will assist engineers and regulators in understanding the technical approaches currently in place to minimize the impact of wildfires due to assets associated with electrical utilities and how to prioritize future mitigation activities.

Lisa VanBuskirk, PE
SFPE Foundation

Lisa VanBuskirk is the Program Manager for Wildfire Urban Interface (WUI) Initiatives at the SFPE Foundation. Her work includes grants management, partnership-building, program evaluation and reporting, events coordination, and training oversight.

Prior to joining the SFPE Foundation, Lisa worked with the AARP Community Challenge Grant as Outreach Coordinator, responsible for tracking and managing grants, grantee reporting processes, and public education via webinars and livestream broadcasts. She is a registered Professional Engineer in Maryland, having worked as a fire protection engineer and code consultant in California, Maryland, and internationally. Lisa is a retired Commander in the United States Coast Guard Reserve, where she had the opportunity to work at the U.S. Coast Guard Marine Safety Center as a reserve fire protection engineer reviewing high-capacity passenger vessel submissions.

Lisa has a M.E. in Fire Protection Engineering from the University of Maryland, College Park and a B.S. in Civil Engineering from the U.S. Coast Guard Academy.

Panel #4 - WUI Working Group Module Updates
Wednesday, August 12, 2:00 – 2:30 pm

Mahdis Borhani, MSc, PhD Student
University of Utah

Doctoral researcher with training in disaster resilience, public policy, and environmental and disaster policy. Currently focusing on wildfire mitigation practice and insurance in WUIs.

Poster: A Framework for Wildfire Resilience for Utility Planning in the Western Interconnection

Wildfires are a growing hazard in many regions of the US, escalating in both frequency and severity in recent years. Power systems significantly intersect with wildfire risk,

	impact, and response; power lines can cause wildfires, while pre- and post-event power loss affects response and recovery. This study examines what options are available to utility providers to engage in disaster planning, how they perceive their actions in relation to short- and long-term disaster risk reduction, and whether they are acting on opportunities to incorporate resilience practices into their plans. It develops a framework for mitigation practice based on mitigation plans across the Western Interconnection, identifying over 300 actionable wildfire resilience strategies through review of these plans, scientific literature, and white papers. Strategies are classified by category of action and disaster management cycle, validated with professionals, and used to identify challenges of implementation
	**Majid Bavandpour, PhD Candidate** **University of Nevada, Reno** Majid Bavandpour is a PhD candidate in Civil and Environmental Engineering at the University of Nevada, Reno, where his research focuses on wildfire data analysis, coupled fire–atmosphere simulation, and probabilistic wildfire risk assessment. His work emphasizes the systematic propagation of uncertainty through nonlinear fire behavior models, with applications to risk-informed decision-making in wildland–urban interface (WUI) fire engineering. Majid has extensive experience developing and implementing physics-based and data-driven models, including wildfire risk frameworks, spotting and pyro-meteor deposition models in WRF-Fire, and large-scale analysis of satellite, radar, and in situ wildfire observations. He has contributed to multiple peer-reviewed journal articles and international conference presentations on wildfire behavior, uncertainty quantification, and fire–atmosphere interactions. Prior to his PhD, Majid worked as a researcher and developer on flood and drought monitoring, early warning systems, and climate prediction tools. He has received multiple academic honors and fellowships recognizing his research excellence. *Poster: Beyond Single-Valued Wildfire Risk: A Computationally Efficient Framework for Systematic Uncertainty Propagation* Wildland–urban interface (WUI) fire engineering increasingly demands risk metrics that move beyond deterministic scenarios and single-valued indicators. We introduce a

probabilistic wildfire risk framework that efficiently quantifies the likelihood and severity of wildfire hazard across the spatial domain. The new approach replaces the traditional reliance on large ensembles of stochastic simulations through a deterministic Generalized Unscented Transform (Gen-UT) for uncertainty propagation. The framework propagates uncertainty in ignition, wind, and fuel conditions through nonlinear fire behavior models, and can incorporate other sources of uncertainty (e.g., modeling errors) at a practical computational cost. Application of the new approach to the 2018 Camp Fire demonstrates good agreement with observed burn probability patterns while also delivering uncertainty-aware outputs suitable for WUI design, mitigation planning, and performance-based decision making. The approach provides a practical pathway for integrating probabilistic wildfire hazard analysis into fire engineering practice.

Mateo Giorgi, PhD Student
University of Maryland, College Park

Matéo Giorgi is a first-year PhD student in the Department of Fire Protection Engineering at the University of Maryland, College Park, under the supervision of Prof. Arnaud Trouvé. His doctoral research focuses on the development of a landscape-scale WUI fire spread simulator (ElMFIRE), with an emphasis on modeling firebrand showering in wildland-urban interface. He conducts fire spread simulations using ELMFIRE, supported by custom post-processing code using MATLAB and Python.

Prior to his PhD, Matéo completed a Master of Science in Fire Engineering and a Bachelor of Science in Mechanical Engineering at Aix-Marseille University. He also completed an internship at the Central Laboratory of the Paris Police Prefecture focused on fire scene reconstruction, and a research internship at the University of Maryland, where he developed his expertise in firebrand transport modeling using FDS. Beyond research, he has been actively involved in student representation and community engagement throughout his academic journey.

Poster: Verification and Grid Convergence Tests for the Development of Landscape-Scale WUI/Urban Fire Spread Simulator

Verification tests and grid convergence tests are a common quality control approach in the development of CFD models. However, so far, these tests have not been adopted by the landscape-scale fire modeling community. We present here a series of test simulations in a one-dimensional academic configuration that serve to verify the numerical accuracy of the firebrand model recently developed by UMD for integration into ELMFIRE, and to check the sensitivity of the predictions to changes in spatial resolution. The academic configuration corresponds to structure-to-structure fire spread due to firebrands and a strong crosswind. The problem is first simulated in MATLAB and then in ELMFIRE. Numerical results are compared to hand calculations of firebrand accumulation and ignition time. The simplified configuration is also simulated with different spatial resolutions, from 1 to 50 m. It is found that due to mapping errors, numerical results are extremely sensitive to changes in spatial resolution.

Mayowa George, PhD
Kansas State University

Mayowa Boluwatife George, PhD, is a fire safety and wildfire risk researcher specializing in grassland fire behavior, fuel moisture modeling, and fire danger indices. He is currently a doctoral researcher at Kansas State University, where his work focuses on developing localized fire danger assessment tools for grassland and wildland urban interface environments. His research integrates dead fuel moisture content modeling, grass curing dynamics, and weather driven fire risk indicators to support safer prescribed burning and improved wildfire prediction. He has presented his work at international conferences, including the American Society of Agricultural and Biological Engineers and the Association for Fire Ecology, and has authored peer reviewed publications in fire and environmental engineering. He currently serves as Secretary of the Student Association for Fire Ecology (SAFE), where he supports professional development, student engagement, and knowledge exchange within the fire ecology and fire management community.

Poster: Modeling Moisture Factors in a Grassland Fire Danger Index for Prescribed Fire Management in the Great Plains

Wildland–urban interface (WUI) fire engineering increasingly demands risk metrics that move beyond deterministic scenarios and single-valued indicators. We introduce a probabilistic wildfire risk framework that efficiently quantifies the likelihood and severity

	of wildfire hazard across the spatial domain. The new approach replaces the traditional reliance on large ensembles of stochastic simulations through a deterministic Generalized Unscented Transform (Gen-UT) for uncertainty propagation. The framework propagates uncertainty in ignition, wind, and fuel conditions through nonlinear fire behavior models, and can incorporate other sources of uncertainty (e.g., modeling errors) at a practical computational cost. Application of the new approach to the 2018 Camp Fire demonstrates good agreement with observed burn probability patterns while also delivering uncertainty-aware outputs suitable for WUI design, mitigation planning, and performance-based decision making. The approach provides a practical pathway for integrating probabilistic wildfire hazard analysis into fire engineering practice.
	**Md Jalal Uddin Rumi, PhD Candidate** **Iowa State University** Md Jalal Uddin Rumi is a Ph.D. Candidate in Mechanical Engineering at Iowa State University, planning to complete his degree in Fall 2026. His research investigates the environmental and occupational health impacts of extreme fires, including wildland-urban interface events and lithium-ion battery blazes. He quantifies ultrafine particle dynamics, trace metal speciation (Ni, Co, Mn, Li), and polycyclic aromatic hydrocarbon (PAH) formation. He employs a comprehensive suite of advanced characterization techniques: gas chromatography-mass spectrometry (GC-MS) for PAHs, Raman spectroscopy and X-ray photoelectron spectroscopy (XPS) for soot nanostructure and surface chemistry, and Fourier-transform infrared spectroscopy (FTIR) for functional group analysis. For aerosol physical properties, he uses scanning mobility particle sizers (SMPS) and optical particle sizers (OPS) to measure particle number and size distributions, along with low-pressure impactors and filter-based sampling to determine size-segregated mass and elemental composition. His work demonstrates that co-combustion generates fractal, metal-rich ultrafine soot agglomerates capable of penetrating all layers of firefighter PPE. These findings link combustion conditions to particle toxicity and are critical for developing refined exposure metrics and decontamination protocols. Mr. Rumi previously served as an Assistant Professor in Bangladesh and holds multiple industry and research leadership roles.

	Poster: Controlled Characterization of Modern WUI Fire Smoke: Beyond PM2.5 Mass toward Size-Resolved Particle and Toxicant Assessment This presentation introduces an engineering-based laboratory framework for controlled characterization of modern wildland–urban interface (WUI) fire smoke using A Controlled Consistent Exposure Simulation System (ACCESS). As WUI fires increasingly involve biomass, synthetic polymers, structural materials, vehicles, and lithium-ion battery components, smoke exposure cannot be adequately represented by biomass combustion or $PM_{2.5}$ mass alone. ACCESS enables controlled heat flux, oxygen supply, repeatable fuel geometry, smoke transport, real-time particle measurement, and size-resolved chemical sampling. The study evaluates a fuel-complexity gradient from biomass-only combustion to mixed-fuel and battery-involved scenarios, with emissions characterized by particle emission factors, particle number and mass distributions, trace metals, and 16 EPA priority PAHs. Findings highlight number–mass divergence, metal and PAH enrichment in exposure-relevant size fractions, and the limitations of $PM_{2.5}$-centered monitoring for assessing WUI smoke toxicity and firefighter exposure risk.
	**Nathan B. Wittasek, PE, CFEI, LEED AP** **Simpson Gumpertz and Heger** Nate Wittasek is a Los Angeles-based fire protection engineer with over 25 years of global experience. He brings a pragmatic, creative approach to clients, specializing in performance-based design to develop flexible solutions where prescriptive codes fall short. His diverse technical expertise encompasses wildfire mitigation, hazardous materials management, code consulting, and forensic analysis. Leveraging a unique background as a firefighter, researcher, and educator at UCLA and Cal Poly Pomona, Nate is uniquely positioned to handle both proactive engineering challenges and reactive failure investigations. Nate is an active member of NFPA and SFPE, serving on technical committees addressing wildland fire protection, tall buildings, life safety systems, and smoke movement.

<table>
<tr><td></td><td>Panel #2 - How Can Engineers Help Drive Better Decision-Making in WUI Communities?
Tuesday, August 11, 2:00 – 2:45 pm</td></tr>
<tr><td></td><td>Nisha Saharan, PhD Student
University of Buffalo

Nisha Saharan is a 2nd-year Ph.D. student in the Department of Civil, Structural and Environmental Engineering at the University at Buffalo. Her research focuses on understanding the impacts of extreme weather and wildfire hazards on the built and natural environment through advanced numerical modeling and simulation. She utilizes coupled atmosphere-fire models, including WRF and WRF-Fire, to investigate wildfire ignition, spread, and fire-atmosphere interactions under complex meteorological conditions. Her work aims to improve hazard assessment, risk mitigation, and community resilience to wildfires and other climate-driven hazards. Her broader research interests include natural hazard modeling, climate resilience, disaster risk reduction, and the application of computational tools to address challenges in civil and environmental engineering.

Poster: Scenario-Based Fire Spread Modeling for WUI Risk Assessment: Application to the 2025 Eaton Fire

The increasing frequency and intensity of extreme wildfires have resulted in substantial economic losses and threats to human life, particularly in wildland–urban interface (WUI) communities. Wildfire behavior is strongly influenced by ignition location, weather conditions, fuel characteristics, and ignition timing. This study presents a scenario-based wildfire spread modeling framework using the 2025 Eaton Fire as a real-world case study. The framework first simulates the observed fire event to establish a baseline for model evaluation. It then explores a range of hypothetical scenarios by systematically varying ignition locations, weather conditions, and fuel characteristics to capture uncertainties in wildfire spread. The effects of structural hardening measures on building vulnerability and fire propagation are also examined. Results demonstrate that ignition location is a key driver of fire spread patterns and community exposure. The proposed framework provides insights into wildfire risk, infrastructure vulnerability, and mitigation</td></tr>
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	effectiveness, supporting improved risk assessment, land-use planning, and resilience strategies in WUI environments.
	**Pascale Vacca, PhD** **Centre for Technological Risk Studies, Universitat Politècnica de Catalunya** Dr. Pascale Vacca is a postdoctoral researcher and assistant lecturer at the Chemical Engineering Department of the Universitat Politècnica de Catalunya (UPC), where she is a member of the Centre for Technological Risk Studies (CERTEC). After completing the International Masters in Fire Safety Engineering, she worked as a fire safety consultant at Jensen Hughes Belgium, before starting her PhD on Wildland-Urban Interface (WUI) fires at UPC. Her research interests are focused on the assessment of risk and vulnerability of assets located at the WUI and the Wildland-Industrial Interface. She investigates wildfire impact and its consequences by means of a performance-based design approach and the use of CFD tools. At UPC, she is involved in the teaching of fire science and risk and safety related courses both at Bachelor's and Master's levels. She is a co-leader of the SFPE Foundation's WUI Working Group. *Speaker: Contributing to WUI community fire preparedness: interdisciplinary activities of the FIREPRIME project* *Tuesday, August 11, 5:55 – 6:15 pm* This presentation explores how interdisciplinary activities can contribute to build WUI community fire emergency preparedness drawing on the experience of the Spanish pilot of the FIREPRIME project. The project engaged residents of WUI areas located within the Collserola Natural Parc (Catalonia, Spain) with the aim of improving their preparedness through collaboration between fire safety engineering expertise, social science analysis, professional knowledge from firefighters and Civil Protection units. Several participatory activities were conducted throughout the project: a testing of a smartphone app which outputs the risk score combining local hazard conditions with the vulnerability of the home and its surroundings, and two Preparedness Days. Together, these activities demonstrate the value of interdisciplinary, community-centred approaches for strengthening wildfire emergency preparedness in WUI areas.

Paulina Mejia
Jensen Hughes

Paulina is a consultant on the wildfire risk mitigation team working out of the Southern California region of Jensen Hughes. Paulina holds a master's degree in public policy with an emphasis on environmental policy. She has over seven years of experience in wildfire planning and outreach, which includes community outreach and engagement, education and program development, and stakeholder coordination and engagement. She currently manages and contributes to a wide array of wildfire risk mitigation projects which include risk assessments, planning and research for utilities, communities, fire safe councils, and government agencies across California and other fire prone regions in North America.

Poster: Beyond Technical Analysis - Lessons in Community and Stakeholder Engagement from a Regional Community Wildfire Protection Plan (CWPP)

Recent wildfire events, including the 2020 Bobcat Fire, 2024 Bridge Fire, and 2025 Eaton Fire, affecting the San Gabriel Valley, have underscored the need for regional approaches to wildfire resilience that extend beyond technical analysis alone. This presentation draws from the development of a Regional Community Wildfire Protection Plan (CWPP) for the San Gabriel Valley Council of Governments (SGVCOG), highlighting how effective community and stakeholder engagement is essential to translating WUI fire engineering into meaningful action. While wildfire hazard and risk analyses provided the baseline foundation of the project, success depended on facilitation, risk communication, and coordination across multiple jurisdictions and stakeholder groups. Through a cohesive engagement process such as public workshops, stakeholder and technical advisory group coordination, the project team worked to make complex wildfire hazards and risk information accessible, credible, and actionable. The presentation shares lessons learned and practical strategies for fire protection engineers supporting community-scale wildfire resilience.

Payton Mooney, EIT, Master's Student
Oregon State University

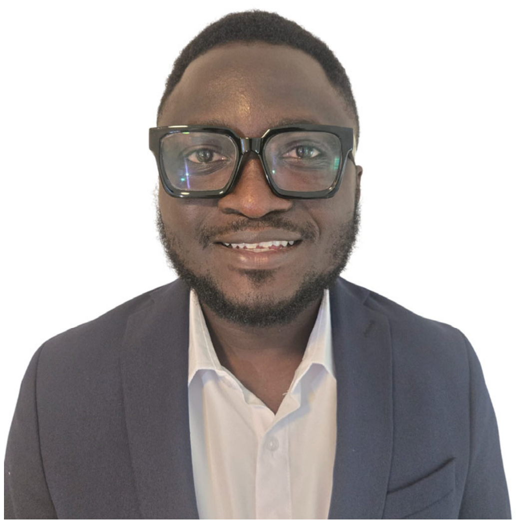
Payton graduated from University of Portland with a BS in Civil Engineering in Spring 2025. She is currently working towards an MS in Civil Engineering with a focus in Structural Engineering at Oregon State University, where she is working as a Graduate Research Assistant.

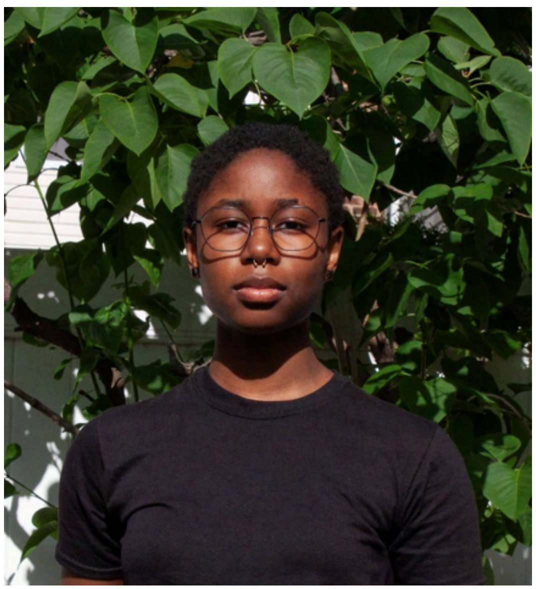
Poster: Housing, Parcel, and Urban Planning Characteristics Affecting Residential Survivability in the 2025 Eaton Fire

This poster summarizes an ongoing study to evaluate the role of housing, parcel, and urban planning characteristics on the survivability of houses in the 2025 Eaton Fire in Los Angeles, CA through the development of logistic regression and random forest models.

	**Pete Abbate, FCAS, MAAA** **Milliman** Pete Abbate, FCAS, MAAA, is a Consulting Actuary with Milliman. Pete has nearly a decade of experience developing actuarially sound property & casualty insurance rates for various programs, including property and catastrophe-exposed property. He leads Milliman's efforts to quantify wildfire suppression capabilities by developing a WUI Fire Protection Score. Pete has presented about wildfire risk at cross-discipline events, representing the insurance industry's perspective on this emerging issue. *Keynote #2 - Insurance Approaches to WUI Risk Assessment and Modeling: Research Gaps and Opportunities for Engineers* *Tuesday, August 11 1:30 – 2:00 pm*

	**Qianru Guo, PhD, PE** **Simpson Gumpertz and Heger** Qianru Guo holds a PhD in Structural Engineering from the University of Michigan. She brings more than ten years of research and industry experience developing technical code compliance and fire protection strategies for a wide range of commercial and public projects. She has deep expertise in performance-based design, including smoke control analysis, timed egress analysis, and structural fire engineering analysis. Qianru is passionate about contributing to professional committees and building code development. She is a co-leader of the SFPE Foundation's WUI Working Group Research Module. In addition, she serves on the NFPA Technical Committees for NFPA 101 and NFPA 5000, ASCE technical committees (SEI Fire Protection, Performance-Based Design, and the Energy Division Fire Protection Committee), and the 2023 New York City Code Revision Committee. *Panel #3 - WUI Education for Engineers* *Wednesday, August 12, 1:15 – 2:00 pm*
	Rachel Fields, EIT **Thornton Tomasetti** Rachel Fields earned her MS in Civil Engineering from Oregon State University and her BS in Civil Engineering from Gonzaga University. Rachel is an engineer at Thornton Tomasetti, working on design as well as investigation of engineering problems and failures. In her master's research, Rachel performed a meta-analysis of existing literature. The studies analyzed suggested characteristics at multiple spatial scales influence housing survivability, including community design, resulting in differing priorities between WUI community types. While inconsistencies exist across post-wildfire observational studies, there are mitigation opportunities that can effectively improve the likelihood of housing survivability, particularly within the home ignition zone. A benchmarked modeling methodology was developed to perform fire propagation modeling for a WUI community. From the transmission pathways analysis, she helped identify high priority intervention

	and mitigation locations. Transmission probabilities and parcel-level ownership highlighted the complex structures that make up high transmission probability categories *Speaker: Wildfire Exposure of Community Infrastructure: A Scenario Analysis for Ashland, Oregon* *Tuesday, August 11, 3:25 – 3:45 pm* Current wildfire scenario modeling typically considers singular fire events to determine exposure of houses. However, due to the anthropogenic nature of fire and the importance of critical infrastructure within community recovery, we need to consider a range of ignition locations in addition to examining the downstream exposure effects on the infrastructure that will aid in the recovery of communities. This presentation summarizes multi-disciplinary modeling efforts to develop a framework that can consider historical ignition locations coupled with benchmarked modeling methodologies to explore hazard exposures for community critical infrastructure.
	**Raphael O. Ogabi, PhD** **Worcester Polytechnic Institute** Raphael Ogabi is a Postdoctoral Research Fellow in the Department of Fire Protection Engineering at Worcester Polytechnic Institute (WPI), where he is currently investigating wildland fire investigations through field- and laboratory-scale experiments. His work integrates experimental research with computational fire modeling tools such as the Fire Dynamics Simulator (FDS) to better understand fire behavior and support advances in fire investigation and wildland fire science. Previously, he was a Senior Research Officer at the National Research Institute for Chemical Technology in Nigeria, where he specialized in advanced natural fiber and polymer composites. *Poster: Enhancing WUI Resilience; Tier Approach System for Fire shelter Development and Standardization* Wildland–Urban Interface (WUI) fire events increasingly expose communities to extreme radiant heat, ember intrusion, and prolonged smoke conditions, yet there are currently no established standards to guide the development and performance of protective shelters

	in these environments. This presentation introduces a tiered-based fire shelter framework designed to support WUI resilience through standardized shelter classifications aligned with evacuation and shelter-in-place strategies. The proposed system defines three tiers based on exposure intensity and occupancy duration, integrating structural hardening, ember-resistant design, and air quality control requirements. The framework combines Hazard Mitigation Methodology (HMM) with Fire Protection Engineering (FPE) principles and leverages computational modeling to evaluate thermal exposure, heat transfer, and internal environmental conditions. By establishing quantifiable performance thresholds for each shelter tier, this work aims to provide a scalable, engineering-based foundation for future WUI shelter standardization. The proposed approach supports community-scale resilience planning and aligns with national wildfire risk reduction initiatives.
	**Rayne Clarke, Undergraduate Student** **University of Michigan and Simpson Gumpertz & Heger** Rayne Clarke is an undergraduate mechanical engineering student at the University of Michigan and a research assistant in the Department of Civil and Environmental Engineering, where she studies wildland-urban interface (WUI) fire behavior with the Jeffers Group. Her current research focuses on uncertainty-aware reconstruction of WUI fire progression using heterogeneous evidence sources, including photographs, videos, dispatch records, witness observations, and geospatial datasets. By integrating these data into a spatiotemporal reconstruction framework, she seeks to better understand fire progression, observation uncertainty, and local indicators of extreme fire behavior. Rayne also serves as a technical intern in the Fire Engineering Division at Simpson Gumpertz & Heger (SGH), where she works on wildfire resilience, fire and life safety engineering, smoke control, and code consulting projects. Her experience includes wildfire hazard assessments, alternate means and methods strategies, code analyses for complex buildings, smoke control modeling, and field inspections related to fire/life safety and accessibility. She has contributed to technical reports, permitting strategies, and engineering methodologies that connect fire science research, building performance, and regulatory requirements.

	Beyond engineering, Rayne has experience in science communication, photojournalism, and public speaking, and is interested in how technical information can support real-world decision-making during disaster events. *Poster: Uncertainty-Aware Spatiotemporal Reconstruction of WUI Fire Progression* Understanding how extreme wildland-urban interface (WUI) fires evolve is challenging because critical fire behavior is often reconstructed from incomplete, uncertain, and heterogeneous evidence. This poster presents a methodology for building uncertainty-aware fire progression reconstructions using incident reports, dispatch records, photographs, videos, witness observations, and geospatial datasets. The framework standardizes diverse observations within a spatiotemporal event database and evaluates each event using structured metrics for temporal precision, spatial precision, source reliability, and evidentiary value. By explicitly representing uncertainty rather than treating observations as deterministic, the method provides a more transparent basis for interpreting fire progression and extreme fire behavior. The reconstruction is integrated with environmental and built-environment data to support analysis of potential spread pathways, spotting activity, and transitions between wildland and urban fire spread mechanisms. The work demonstrates how uncertainty-aware reconstruction can improve post-fire analysis, support future modeling efforts, and inform decision-making in WUI fire engineering.
	Rebecca Harned **UL Research Institutes' Fire Safety Research Institute** Rebecca Harned is a principal research scientist for the Fire Safety Research Institute, part of UL Research Institutes. In her role, Rebecca will support the National Emergency Response Information System by developing a comprehensive National Fire Risk Index that provides a consistent framework to measure various types of fire risks at the most local level, on a nationwide scale. Rebecca holds a Bachelor of Science degree in biology and a Master’s degree in international peace and conflict studies. She possesses over 20 years of experience working with the fire service and emergency management community

at the intersection of technology, science, and policy. Rebecca most recently served as the advisor on technology and data modernization to the US Fire Administration (USFA) within the Federal Emergency Management Agency (FEMA). She has also served in various senior leadership and management capacities within FEMA, the International Association of Fire Chiefs (IAFC), the National Alliance for Public Safety GIS (NAPSG) Foundation, and the National Association of State Fire Marshals, among other organizations.

Speaker: Benchmarking Current Capabilities and Gaps in Wildfire Risk Modeling Science and Technology: Findings from the Wildfire Risk Modeling Exercise
Wednesday, August 12 9:50 – 10:10 am

As destructive wildfires increasingly threaten communities and the built environment, our ability to consistently measure, understand, and predict wildfire risk remains limited. Effectively measuring wildfire risk is the very foundation needed to guide effective mitigation investments and response operations. At this critical moment, it is essential to better understand the distinct strengths of existing wildfire risk models and how they can be integrated to deliver more precise, actionable intelligence.

This session offers a deep dive into the scientific and technological insights from the first-ever Wildfire Risk Modeling Exercise conducted in early 2026. More than 40 organizations worldwide participated, bringing a diverse range of modeling approaches—from statistical and stochastic methods to semi-physics and AI-driven models. The session will present benchmarking results across these approaches, highlight opportunities for model ensembles, and examine key gaps in current modeling capabilities. Attention will be given to how well existing methods capture the complex dynamics of wildfire in wildland–urban interface (WUI) transition zones and the built environment.

Reza Ziazi, PhD
Worcester Polytechnic Institute

Reza Ziazi is an Assistant Research Professor with expertise in fire and fluid dynamics, as well as data science at Department of Fire Protection Engineering at Worcester Polytechnic Institute. He is also a co-principal investigator (Co-PI) proficient in data-driven quantification and modeling in several projects spanning from Wildland fires and WUI. His recent areas of expertise are the fire spread risk modeling and shelter design at the WUI, and multi-scale physics of the interactions between fire, wind and vegetation in modeling wildfire spread and understanding the fire dynamics and their effects on emissions.

Poster: Enhancing WUI Resilience; Tier Approach System for Fire shelter Development and Standardization

Wildland–Urban Interface (WUI) fire events increasingly expose communities to extreme radiant heat, ember intrusion, and prolonged smoke conditions, yet there are currently no established standards to guide the development and performance of protective shelters in these environments. This presentation introduces a tiered-based fire shelter framework designed to support WUI resilience through standardized shelter classifications aligned with evacuation and shelter-in-place strategies. The proposed system defines three tiers based on exposure intensity and occupancy duration, integrating structural hardening, ember-resistant design, and air quality control requirements. The framework combines Hazard Mitigation Methodology (HMM) with Fire Protection Engineering (FPE) principles and leverages computational modeling to evaluate thermal exposure, heat transfer, and internal environmental conditions. By establishing quantifiable performance thresholds for each shelter tier, this work aims to provide a scalable, engineering-based foundation for future WUI shelter standardization. The proposed approach supports community-scale resilience planning and aligns with national wildfire risk reduction initiatives.

Riyaaz Shaik, PhD
University of California, Los Angeles and Berkshire Hathaway

Dr. Riyaaz Shaik is a scientist at Berkshire Hathaway Inc., specializing in remote sensing for wildfire catastrophe models. He earned his M.S. and Ph.D. in Satellite Systems and Services from Sapienza University of Rome, Italy, in 2022. That same year, he joined UCLA's Civil & Environmental Engineering Department as a postdoctoral researcher and became a research scientist in 2024. Dr. Shaik served as a co-principal investigator (PI) on multiple wildfire research projects that leverage remote sensing, machine learning, and nonlinear empirical dynamics to advance wildfire science. He has published extensively in leading journals and conferences and has mentored numerous student researchers. Beyond research, he is a lecturer at UCLA, teaching Applied Numerical Methods, and a research affiliate at the University of Illinois Urbana-Champaign, supporting wildfire-related initiatives. His work bridges the gap between cutting-edge remote sensing technologies and practical wildfire management solutions. To learn more about his research, visit his portfolio at https://sites.google.com/g.ucla.edu/riyaaz-shaik/.

Poster: WUIgniS: A Physics-Informed and Inference-Guided Numerical Ignition and Spread Simulator for Wildland-Urban Interface Fire

WUIgniS is a physics-informed numerical ignition simulator being developed to model wildfire spread in wildland-urban interface communities. The tool represents key ignition mechanisms, including thermal radiation, direct flame contact, and wind-driven firebrand spotting, while incorporating urban and vegetative fuel data. It is driven by mesoscale fire-atmosphere simulations that provide evolving fire-front locations and high-resolution surface wind fields, allowing dynamic wind effects to be included in community-scale simulations. WUIgniS is being evaluated using major WUI fire events, including the 2025 Eaton Fire and the 2023 Lahaina Fire. Through parameter exploration and scenario-based optimization, the tool aims to improve uncertainty-aware, scalable, and interpretable prediction of ignition and fire spread in WUI environments.

Rosie Matthews, PhD Candidate
University of Canterbury

Rosie Matthews is a PhD candidate at the University of Canterbury, New Zealand, specialising in quantitative wildfire risk assessment in the Wildland–Urban Interface (WUI). Her research focuses on improving the representation of how fires transition from vegetation into the built environment by integrating wildfire spread modelling with building vulnerability analysis.

Her work involves developing fragility curves for typical New Zealand residential structures to quantify ignition and damage likelihood under radiant heat flux and firebrand exposure. These relationships are embedded within coupled vegetation and structure-to-structure fire spread models to better capture feedbacks between burning vegetation and buildings. Using this integrated framework, Rosie evaluates the effectiveness of wildfire mitigation strategies, including fuel management, defensible space, and building hardening, under both current and projected climate conditions.

Her research aims to strengthen model validation against real wildfire events and to provide quantitative evidence to support policy development, building standards, and community-level adaptation to increasing wildfire risk.
In the most destructive Wildland–Urban Interface (WUI) fires, defensive firefighting strategies are often the only viable means of protecting lives and assets when direct containment is unlikely to succeed. Defensive actions include defensible space, asset protection, structure triage, shelter-in-place, and access and egress management. Despite their operational importance, these concepts remain poorly integrated into a coherent scientific or quantitative framework for assessing risk and preparedness.

Poster: Defensive Firefighting: Where is the research?

While most fires are now successfully controlled in initial attack, a residual class of low-frequency, high-consequence fires remains uncontainable, as seen during Australia's Black Saturday fires and the 2025 Los Angeles fires. Agencies worldwide are increasingly compelled to adopt defensive strategies, yet their transition and effectiveness remain largely unexamined by science. Drawing on findings from the January 2026 Harcourt fire

	in Victoria—where 57 houses were lost but a similar number were saved—we propose a conceptual model for profiling defensive firefighting capability and capacity. We discuss policy implications and outline a research agenda that bridges operations, quantitative modelling, and policy reform to better prepare for extreme fires. *Poster: Integration and Validation of Coupled Wildland-Urban Fire Spread Models for Enhanced WUI Risk Assessment* Wildfires are increasingly threatening communities in the Wildland–Urban Interface. Recent disasters such as the Camp Fire in California show how quickly fires can spread from forests into towns, causing devastating losses. However, most existing fire models focus either on fires in vegetation or fires in buildings, and rarely capture how these two processes interact. This research develops a new modelling approach that links wildfire behaviour with building ignition and fire spread within communities. By allowing burning buildings to influence fire behaviour in surrounding vegetation, the model better reflects how real fires evolve in towns and suburbs. This integrated framework enables more realistic assessment of wildfire risk and helps evaluate mitigation strategies such as defensible space, fuel management, and fire-resistant building materials. The results aim to support safer community design, improved building standards, and more effective planning for wildfire-prone areas.
	Rui Li, PhD **Iowa State University** Dr. Rui Li is an experienced researcher and project coordinator specializing in protective clothing, firefighter safety, thermal protection, and smoke exposure assessment. His work supports the development and implementation of advanced testing methods for evaluating PPE performance, contamination, and decontamination under occupational exposure conditions. Dr. Li has strong capabilities in laboratory management, experimental coordination, and multi-project execution. He is experienced in organizing laboratory operations,

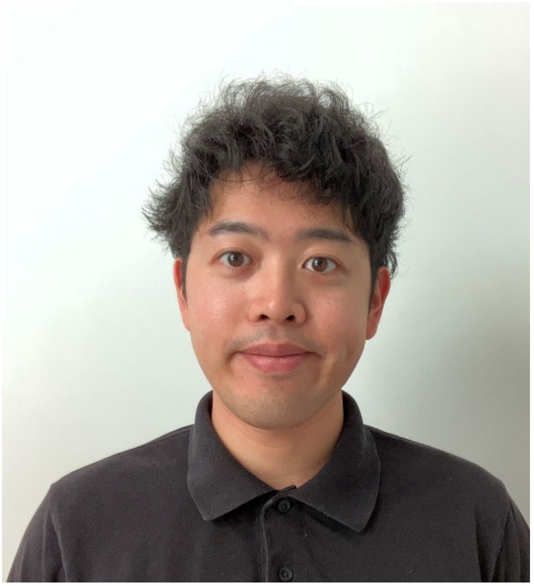
coordinating equipment use, supporting student and researcher training, maintaining research workflows, and ensuring data quality across complex experimental programs. His technical experience includes thermal protective performance testing, sweating manikin and guarded hotplate evaluation, combustion-generated smoke exposure, particle and chemical sampling, and PPE contamination assessment.

Beyond laboratory operations, Dr. Li contributes to program management and interdisciplinary coordination. He supports communication among faculty, graduate researchers, technical staff, external collaborators, and funding partners to ensure that project objectives, timelines, and deliverables are achieved efficiently. His combined expertise in laboratory execution, project organization, team coordination, and research documentation makes him a valuable contributor to funded projects focused on firefighter exposure reduction, PPE innovation, and occupational health protection.

Poster: Controlled Characterization of Modern WUI Fire Smoke: Beyond PM2.5 Mass toward Size-Resolved Particle and Toxicant Assessment

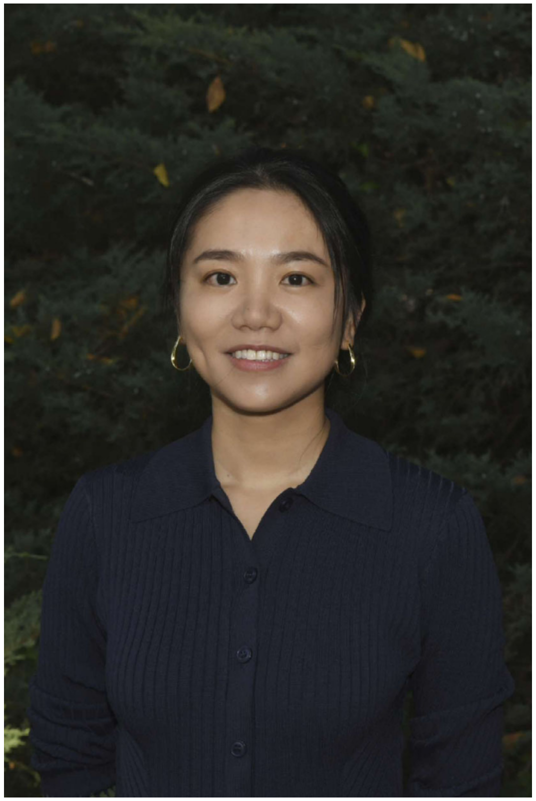
This presentation introduces an engineering-based laboratory framework for controlled characterization of modern wildland–urban interface (WUI) fire smoke using A Controlled Consistent Exposure Simulation System (ACCESS). As WUI fires increasingly involve biomass, synthetic polymers, structural materials, vehicles, and lithium-ion battery components, smoke exposure cannot be adequately represented by biomass combustion or $PM_{2.5}$ mass alone. ACCESS enables controlled heat flux, oxygen supply, repeatable fuel geometry, smoke transport, real-time particle measurement, and size-resolved chemical sampling. The study evaluates a fuel-complexity gradient from biomass-only combustion to mixed-fuel and battery-involved scenarios, with emissions characterized by particle emission factors, particle number and mass distributions, trace metals, and 16 EPA priority PAHs. Findings highlight number–mass divergence, metal and PAH enrichment in exposure-relevant size fractions, and the limitations of $PM_{2.5}$-centered monitoring for assessing WUI smoke toxicity and firefighter exposure risk.

	**Ruiqing "Ryan" Shen, PhD** **Oklahoma State University** Dr. Ruiqing “Ryan” Shen is an Assistant Professor in Fire Protection & Safety Engineering Technology at Oklahoma State University. Driven by a vision to safeguard people, communities, and the environment, Dr. Shen’s research focuses on: Developing eco-friendly fire-safe materials; Designing cost-effective engineering safety and health strategies; Integrating new technologies into chemical process safety; Enhancing fire safety of energy storage systems; and Improving occupational health and safety. *Poster: Formation and Visualization of Wildfire-Induced Soil Water Repellency in Laboratory-Scale Experiments* Soil water repellency (SWR) arises from hydrophobic-layer formation that reduces the soil’s ability to absorb water, accelerating rainfall conversion to surface runoff and increasing risks of erosion and flooding. Wildfire is a particularly strong driver of SWR, enhancing both the persistence and severity of soil hydrophobicity. However, many studies rely on muffle-furnace heating under uniform, isothermal conditions that fail to represent the steep temperature gradients and spatially heterogeneous heating produced during wildfires. To better capture wildfire-relevant processes and link microscale wettability changes to macroscale hydrologic responses, this study will develop an experimental framework that complements conventional approaches. It will evaluate top-down heating–induced temperature gradients and associated heat-driven transport, the influence of soil organic matter on hydrophobic-layer depth and continuity, and the role of initial soil moisture in controlling formation thresholds and post-heating stability. This approach will advance mechanistic understanding and improve predictions of post-wildfire runoff and soil erosion hazards.
	Ryota Yagi, MEng, PhD Student **University of Nevada, Reno** Ryota Yagi is a PhD student in Computer Science and Engineering at the University of Nevada, Reno, where his research focuses on wildfire monitoring and prediction using computer vision and remote sensing. His current work explores spatial super-resolution

	of high-temporal-resolution GOES satellite observations to better characterize wildfire dynamics, intensity, and progression. Mr. Yagi received his M.Eng. and B.Eng. degrees from the University of Tokyo in Aeronautics and Astronautics, where he specialized in satellite image analysis, cross-view geo-localization, and statistical image alignment. His background includes extensive experience with satellite imagery, UAV-based sensing, and efficient deep learning models. He has published in venues spanning remote sensing, computer vision, and applied machine learning, and has participated in international research collaborations and internships in both academia and industry. *Speaker: Near-Real-Time Monitoring of WUI Fires Using Super-Resolved GOES Imagery* *Wednesday, August 12, 9:30 – 9:50 am* Near-real-time monitoring of fire progression near the wildland-urban interface (WUI) is critical for timely response, as it enables wide-area awareness of fire conditions to protect life and property. Polar-orbiting sensors such as the Visible Infrared Imaging Radiometer Suite (VIIRS) offer high spatial resolution but lack the temporal frequency required for near-real-time fire monitoring. To address this limitation, we apply deep learning-based super-resolution to enhance observations from the Geostationary Operational Environmental Satellite (GOES). We construct a new large-scale paired GOES-VIIRS dataset comprising over 1,000 fire events between 2018 and 2024, including both fire and non-fire regions. Using this dataset, well established super-resolution models in the computer vision community are applied to WUI fire monitoring to enhance the spatial resolution of GOES observations from 2 km to 375 m. Our work clarifies the performance and limitations achievable with current deep learning-based super-resolution models for near-real-time WUI fire monitoring.
	Sara Cristina Rodrigues Alexandre, MSc, Architect (European Fire Safety Technician Programme – CFPA-Europe, in progress) **SOLIDCOLUMN** Sara Cristina Rodrigues Alexandre is an architect and fire safety and civil protection consultant with extensive professional experience in the design, implementation, and

	assessment of fire safety and self-protection measures in regulated and high-risk contexts. She is the founder and managing director of SOLIDCOLUMN, an engineering and consulting firm established in 2016, where she coordinates multidisciplinary projects in architecture, fire safety, occupational safety, and risk prevention. She has been professionally involved in fire safety in buildings since 2009 and is registered with the Portuguese Architects' Association and the National Authority for Emergency and Civil Protection. She is currently completing the European Fire Safety Technician Programme awarded by CFPA-Europe. Alongside her professional practice, she is completing a Master's degree in Risk and Civil Protection, with research focused on community prevention, risk perception, and the design of communication and prevention frameworks for communities exposed to natural hazards. Her work bridges regulatory fire safety practice, architectural design, and community-level prevention strategies, with growing focus on wildland–urban interface contexts. She is a member of the Society of Fire Protection Engineers (SFPE) and APSEI. She is a co-leader of the SFPE Foundation's WUI Working Group Research Module *Poster: Beyond Building-Centric Fire Safety: Practice-Based Insights on Community Preparedness and Risk Prevention in WUI Contexts* Fire safety and risk prevention frameworks are frequently structured around building-level compliance and prescriptive self-protection measures. While these approaches are effective at the individual asset scale, they often prove insufficient to address community-level risk in complex hazard environments such as the wildland–urban interface (WUI). Drawing on professional practice in architecture, fire safety, and civil protection, as well as research on community prevention and risk perception, this contribution examines the gap between formal regulatory compliance and effective community preparedness. The work highlights how prevention strategies tend to prioritize documentation, plans, and informational actions, with limited evidence of sustained mechanisms that reduce exposure, strengthen collective readiness, or ensure continuity of essential services. By reframing fire safety practice through a prevention-oriented and community-aware lens, the presentation supports the development of integrated

	approaches that bridge building-focused safety, territorial context, and community-level preparedness in WUI settings.
	**Serdar Selamet, PhD** **Exponent and Stanford University** Dr. Selamet is also an Adjunct Lecturer in the Department of Civil and Environmental Engineering at Stanford University, where he teaches graduate-level fire engineering and supervises research on structural fire behavior and performance-based design. His research focuses on physically motivated modeling of fire exposure, ignition vulnerability, and cascading structure-to-structure fire spread at building, parcel, and community scales. He is actively involved in interdisciplinary WUI fire engineering initiatives, post-fire forensic investigations, and the development of engineering-based vulnerability indices to support risk-informed mitigation and resilience planning. Dr. Selamet collaborates with academic, industry, and public-sector partners on applied wildfire resilience research and consulting efforts. He holds a PhD in civil engineering and is a Certified Fire and Explosion Investigator (CFEI). He is a co-leader of the SFPE Foundation's WUI Working Group Research Module. *Panel #3 - WUI Education for Engineers* *Wednesday, August 12, 1:15 – 2:00 pm*
	Shuna Ni, PhD **University of Maryland, College Park** Dr. Shuna Ni is an Assistant Professor of Fire Protection Engineering at the University of Maryland, College Park. Ni's research focuses on fire forensics, fire resilience of wildland-urban interface communities, structural fire engineering, impact of fire on civil infrastructure, and fire safety of tall mass-timber buildings. Her research has been funded by the National Science Foundation, National Institute of Justice, Fire Protection Research Foundation, University Transportation Centers, BLM-National Interagency Fire

	Center, Grand Challenges Grants Program at the University of Maryland, and industrial partners. *Poster: Empirical Fragility Surfaces for Wildland–Urban Interface Structure Damage Based on Site and Building Characteristics* Wildland–urban interface wildfires threaten built environments, motivating fragility-based approaches for risk assessment and damage estimation. However, defining appropriate intensity measures for wildfire-exposed structures remains challenging. Post-fire damage datasets typically lack building-specific heat exposure information, and experimental measurements of heat exposure are sparse and costly. Moreover, current wildfire models cannot reliably predict building-scale heat exposure or structural response under external fire conditions. Consequently, heat exposure is not a practical intensity measure for wildfire fragility analysis, motivating the use of non-thermal proxy intensity measures. This study develops an empirical fragility framework using bivariate fragility surfaces defined by a Site Index (SI) and a Building Index (BI). Using available wildfire damage data, observed damage probabilities are estimated and normalized by regional wildfire ignition probability and modeled as functions of SI and BI using nonparametric kernel density estimation. The resulting fragility surfaces provide a quantitative basis for risk-informed mitigation and wildfire-resilient building design. *Poster: From Practice to Policy: Examining Wildfire Hazard Mitigation & Regulatory Frameworks* Wildfire mitigation guidance is abundant, spanning peer-reviewed research, agency and community programs, and insurer recommendations, yet adoption into codes and policy remains uneven. This presentation describes an evidence-to-policy mapping effort that couples (1) a PRISMA-based systematic review of wildfire hazard mitigation literature and programs with (2) a structured review of model codes and standards (e.g., NFPA 1140/1144 and the ICC International Wildland-Urban Interface Code) plus selected state and local requirements. Findings are synthesized across home and property protection, education and outreach, community and land-use planning, and policy, economics, and insurance. A weighted gap-ranking framework (evidence strength, feasibility, cost, and

	insurer/regulator alignment) then identifies the most consequential translation gaps and the most actionable opportunities for engineers, AHJs, and policymakers to close them.
	**Steve Kerber, PhD** **UL Research Institutes' Fire Safety Research Institute** Dr. Steve Kerber is vice president and executive director of the Fire Safety Research Institute (FSRI) at UL Research Institutes. He leads a fire safety research team dedicated to addressing the world's unresolved fire safety risks and emerging dangers to reduce death, injury, and loss from fire. He is on the Board of Governors of the SFPE Foundation. *Co-host* *Opening Remarks* *Tuesday, August 11 8:30 – 8:45 am* *Keynote #1 - What Is the WUI Fire Problem?* *Tuesday, August 11, 8:45 – 9:15 am* *Closing Panel #5 - Creating the Infrastructure for WUI Fire Engineering Research and Collaboration.* *Wednesday, August 12, 4:30 – 5:00 pm*

Subhojit Roy, PhD Student
University of Maryland, College Park

A PhD student with a background in Mechanical Engineering and Fire Protection Engineering, Subhojit Roy is actively researching in the field of combustion and fire. His current research focuses on low-temperature flames and the chemistry behind these combustion phenomena.

Poster: Cool Flame Chemistry in Biomass Smoldering

The unpredictable transition from smoldering to flaming (StF) combustion severely escalates fire spread and hazards in Wildland-Urban Interface (WUI) environments. While StF relies on gas-phase pyrolyzate ignition, the precise chemical pathways bridging low-temperature smolder (~900 K) to hot flaming (>1500 K) remain poorly quantified.

This study investigates the hypothesis that gas-phase low-temperature chemistry (LTC), specifically cool flames, serves as the primary catalyst for this transition. Recent findings indicate that LTC can lower auto-ignition temperatures by up to 400 °C and shorten ignition delay times by two orders of magnitude. Crucially, the microenvironment above smoldering biomass provides the ideal intermediate temperatures, heavy hydrocarbons, and oxygen availability to sustain cool flames. By adapting an established cool diffusion flame setup to test smoldering biomass, this research aims to map these critical chemical stepping stones, ultimately improving predictive wildfire modeling, risk assessment, and WUI mitigation strategies.

Supriya Bharti, PhD Student
Utah State University

Supriya Bharti is a Graduate Research Assistant in Civil and Environmental Engineering and is pursuing her Ph.D. in structural fire engineering at Utah State University. She completed her master's degree from IIT Jammu in 2024. Her research focuses on sustainable and high-performance cementitious materials.

	Her research focuses on sustainable and high-performance concrete systems, including Ultra-High-Performance Concrete (UHPC), supplementary cementitious materials, and low-carbon binders such as ground glass pozzolan (GP), belitic calcium sulfoaluminate (BCSA) cement, and precipitated calcium carbonate (PCC). She specializes in experimental testing, mix design optimization, and thermal and microstructural characterization to evaluate mechanical performance, durability, and elevated-temperature behavior. Her work aims to advance the development of sustainable, fire-resilient concrete systems for future infrastructure applications. She has contributed to several research projects and conference presentations in the fields of advanced cement-based materials and structural fire performance. *Poster: Fire Performance of Belitic Calcium Sulpho Aluminate (BCSA)-Based Cementitious Systems for Wildland-Urban Interface Application* Wildland-Urban Interface (WUI) fires subject infrastructure to severe thermal exposure, increasing the demand for construction materials that are both resilient and sustainable. This study investigates the elevated-temperature behavior of Belitic Calcium Sulfoaluminate (BCSA)-based cementitious systems with varying water-to-binder ratios and steel fiber reinforcement. Hot-state compressive strength tests were conducted from room temperature to 800°C, while Thermogravimetric Analysis (TGA) and Derivative Thermogravimetric Analysis (DTG) were used to examine thermal degradation mechanisms. Although all mixtures experienced strength loss with increasing temperature, the steel fiber-reinforced mixture demonstrated superior performance and retained the highest strength at elevated temperatures. Thermal analysis revealed significant degradation below 150°C due to moisture loss and ettringite decomposition, followed by further degradation between 700-800°C associated with carbonate decomposition. The findings provide insight into the thermal stability and fire performance of BCSA systems and their potential application in resilient infrastructure exposed to WUI fire conditions.

Tadele Mekuriaw Getu, PhD Candidate
Queen's University

Tadele Mekuriaw Getu is a PhD Candidate in the Department of Civil Engineering at Queen's University. His research focuses on housing resilience to wildfire and smoke exposure in resource-constrained and wildland–urban interface (WUI) communities. Drawing on a multidisciplinary background in architecture, urban planning, and civil engineering, his work integrates wildfire vulnerability assessment, post-fire damage analysis, geospatial technologies, and resilience-based approaches to support evidence-based wildfire risk reduction. Prior to pursuing his PhD, he served as a faculty member at University of Gondar. Tadele is a recipient of an SFPE Foundation Student Research Grant and has presented his research at national and international conferences. His research aims to improve housing resilience and community safety in wildfire-prone regions.

Poster: Housing Vulnerability Classification Framework for Wildland–Urban Interface Fires in Remote and Data-Constrained Communities

Wildland–urban interface (WUI) fires increasingly threaten communities worldwide, yet many remote and resource-constrained communities lack the detailed data required by conventional wildfire risk assessment methods. This presentation introduces a housing vulnerability classification framework designed to support parcel-level wildfire vulnerability assessment using observable indicators. Developed through a systematic review of wildfire vulnerability factors and informed by housing resilience challenges in remote First Nations communities in Canada, the framework incorporates structural characteristics, exposure conditions, and contextual factors influencing wildfire risk. The approach translates established WUI fire engineering concepts, including defensible space, firebrand exposure, and structure-to-structure fire spread, into a practical assessment tool that can be applied where detailed datasets are unavailable. The framework is intended to support mitigation prioritization, resilience planning, and wildfire risk reduction in underserved and wildfire-prone communities.

Tanmay Vora, PhD Candidate
University of Michigan

Tanmay is a third year PhD candidate in civil engineering at the University of Michigan. He earned his bachelor's from University of Mumbai and master's from the University of Michigan both in civil engineering. His research focuses on developing community-scale simulations for modeling fire spread in the Wildland-Urban Interface (WUI). In his free time he likes to travel, cook, watch horror movies, and documentaries.

Speaker: Multi-level Framework to Model Wildfires at the Wildland-Urban Interface: Case Study
Wednesday, August 12, 11:40 – 12:00 pm

The recent Eaton and Palisades fires caused massive destruction to homes and other buildings. This abstract introduces a multi-level framework for modeling wildfires at the wildland-urban interface (WUI). For the purposes of modeling accurately and efficiently, the WUI is divided into four nested domains–wildland, transition, surrounding community(ies), and neighborhood(s) of interest–each treated with increasing modeling fidelity. Fire spread in the wildland, transition, and urban domains is modeled using SWUIFT coupled with WRF-Fire, an approach that was validated against the 2021 Marshall Fire (Szasdi-Bardales et al. 2025). For the neighborhood(s) of interest, where fire spread from structure-to-structure or by connective fuels is of interest, a computational fluid dynamics (CFD) approach using a Euler-Euler multiphase model is employed. The proposed framework represents a significant advancement in the modeling of fire spread in urban areas using a physics-based approach.

Troy Ferland, PhD
UL Research Institutes' Chemical Insights

Dr. Troy Ferland earned his degree in Geosciences from Penn State University in 2022. He joined Underwriters Laboratories following postdoctoral fellowships at the EPA's Office of Research and Development and the Lamont-Doherty Earth Observatory of Columbia University.

Poster: Incorporating municipal data to estimate fuel loads and characterize WUI fire-derived chemical fingerprints from the Lahaina Fire

We present metals concentrations collected via X-ray Fluorescence (XRF) from soil samples following the Lahaina Fire. To contextualize the potential impacts of the built environment in the observed chemistry of the WUI fire, we accessed building material data from Maui County's publicly available municipal records and used these to estimate the mass and chemistries of combustible materials present during the Lahaina Fire. This provides useful context for the chemical fingerprints observed in collected soil samples.

Van Nguyen, PhD Student
West Virginia University

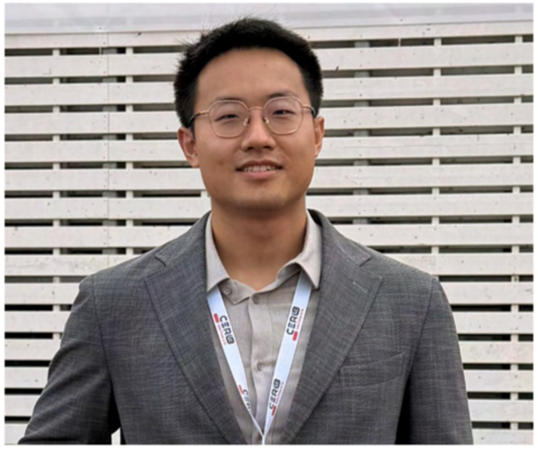
Van Nguyen is a current PhD student at West Virginia University's School of Medicine in the Cellular and Integrative Physiology program. Prior to graduate school, she graduated from Pennsylvania State University with a Bachelor of Science in Biomedical Engineering with a focus in Medical Imaging and Devices. Her research focuses on how inhalation of surrogate combustion emissions impact systemic microvascular function.

Poster: Inhalation Exposure to Surrogate Wildland Urban Interface Fire Emissions Impairs Microvascular Function

The health effects of wildland urban interface fires are poorly studied. It is understood that wildfire emission exposures lead to an increase in adverse health outcomes including, but not limited to, pulmonary, neurological, and cardiovascular responses. Systemic microcirculation is often the cause or consequence of many diseases.

	However, systemic microvascular responses have not been studied following WUI fire emission exposures. To study this, a computer-controlled modified pellet stove served as a surrogate combustion emissions generator to burn representative WUI pellets made up of 55% pine, 25% oriented strand board, 17% vinyl, and 3% green foam board. 7-8 week-old rats were exposed in a whole-body inhalation exposure chamber for 4 hours for 1-3 days. Endothelium-dependent arteriolar dilation, endothelium-independent dilation, and vasoconstriction were assessed. As a result of these experiments, microvascular dysfunction was observed as impaired endothelium-dependent arteriolar dilation.
	**Willa Egan, PhD Student** **University of Buffalo** Willa is a first-year PhD student in the Civil, Structural and Environmental Engineering department at the University at Buffalo, working with Dr. Elhami-Khorasani in modeling and hazard analysis of wildfire spread into WUI communities. With an educational background in both environmental and geotechnical engineering, her interest in wildfire risk management is diverse. Her current work involves leveraging multiple remote sensing data streams to generate fine-resolution fuel moisture content maps to improve the accuracy of coupled wildland-community fire spread modeling. *Poster: Parcel-Scale Fire Damage Risk Assessment in Wildland Urban Interface* A novel fire risk assessment model for evaluating house fuel load and forecasting structural damage in Wildland-Urban Interface (WUI) fires is developed. The overall methodology consists of three key steps: (1) collecting a database of structures and corresponding environmental information and images in WUI communities, (2) developing a house attribute recognition method based on pattern recognition models to calculate the structural fuel load and indoor fuel load, and (3) building a nonlinear correlation between the extent of structural damage and multiple parcel-scale factors, e.g. vegetation coverage, fuel load, and distance to nearest combustibles.

	**William Koffel, PE** **Koffel Associates and University of Maryland, College Park** Bill Koffel is Sr. Director, Special Projects of Koffel Associates, a fire protection and life safety engineering design and consulting firm, and Clinical Associate Professor, Department of Fire Protection Engineering, University of Maryland. Bill is active in the development process of the industry's governing codes, standards and design guidelines including International Code Council (ICC), NFPA, Society of Fire Protection Engineers (SFPE) and Underwriters Laboratory (UL). He is a member of many NFPA Technical Committees and ICC committees. A former code official with the Maryland State Fire Marshal's Office, he is a Past President of the SFPE. He is a co-leader of the SFPE Foundation's WUI Working Group Education Module. *Panel #4 - WUI Working Group Module Updates* *Wednesday August 12, 2:00 – 2:30 pm*
	**William Skene, PE** **FM** William Skene, PE is an Assistant Vice President and Senior Staff Engineering Specialist in the Chief Engineer's Group at FM. He has been with FM for 15 years and is responsible for FM's Property Loss Prevention Data Sheets on wildfire risk mitigation, maximum foreseeable loss, and passive fire safety. He also serves on several NFPA technical committees and holds roles as a Fire Marshal and Fire Chief in Woodstock, CT, bringing practical emergency management experience to his technical expertise. *Speaker: Mitigating Wildfire Risk to Structures: Best Practices from FM Data Sheet 9-19* *Tuesday, August 11, 11:25 – 11:45 am* The purpose of this presentation is to inform stakeholders on the best practices outlined in FM Data Sheet 9-19 to prepare for, mitigate, and recover from wildfire risks to

	structures. With increasing wildfire frequency and severity globally, understanding these guidelines is critical for safeguarding assets and ensuring business continuity.
	**Yiren Qin, PhD** **University of California, Berkeley** Yiren Qin, PhD, is a Postdoctoral Researcher at the University of California, Berkeley. He recently received his PhD from the University of Maryland, College Park, where his doctoral research focused on introducing a novel framework for firebrand exposure simulation within the landscape-scale wildfire simulator, ELMFIRE. His expertise lies in landscape-scale fire modeling at the wildland-urban interface (WUI). His current research primarily utilizes modern modeling tools to investigate and simulate WUI fire spread mechanisms. By bridging these insights, he aims to leverage advanced modeling knowledge to enhance community-scale WUI fire simulations and resilience. *Poster: Experimental and FDS-Based Assessment of Zone 0 Vegetation-Induced Fire Exposure during Structure-to-Structure Fire Spread* Vegetation management in Zone 0, the area immediately adjacent to structures, is increasingly emphasized for wildfire risk reduction. However, the effect of near-building hedge vegetation on structural fire exposure during severe structure-to-structure fire scenarios remains poorly quantified. In this study, Fire Dynamics Simulator (FDS) simulations are used to assess the thermal response of a wall assembly exposed to near-structure vegetation under varying moisture contents and vegetation configurations. Vegetation is represented as ensembles of Lagrangian particles with prescribed geometric distributions and fuel properties, enabling parametric evaluation beyond the available experiments. The simulations are benchmarked against field-scale experiments using heat flux measurements at corresponding wall locations. Results indicate that near-building vegetation may temporarily shield portions of the wall before ignition or sustained burning. Once ignited, however, the vegetation can become an additional localized exposure source, increasing wall and eave heat flux and potentially contributing to further fire spread.

Yuying Ren, PhD Candidate
University of Colorado, Boulder

Yuying Ren is a Ph.D. candidate in the Department of Geography at the University of Colorado Boulder. She holds a B.S. in Geography with a focus on Geographic Information Science from Pennsylvania State University and an M.A. in Geography from the University of Colorado Boulder. Her expertise includes Geographic Information Science (GIS), geospatial data engineering, machine learning, and large-scale spatiotemporal analysis. Her research focuses on human–environment interactions, wildfire risk, and the Wildland–Urban Interface (WUI). She has experience developing end-to-end data pipelines that integrate large, multi-source geospatial datasets into scalable, analysis-ready data products. Her technical background includes Python-based geospatial processing, feature engineering, spatial modeling, and high-performance computing, with applications in environmental mapping, risk assessment, and spatial decision support. She is interested in applying machine learning and geospatial data engineering to autonomous mapping, environmental monitoring, and spatial risk modeling.

Student Pitch: WUI-LLM: A Decision Support Dashboard for High-Quality Wildland Urban Interface Data

Our group has published high-quality and peer-reviewed maps of wildland urban interface (WUI) and fire exposure probability maps through time (1990 to 2020) for WUI properties in the contiguous United States. These maps present a detailed view into how U.S. WUI areas have evolved through time and what present wildland fire exposures they may face. A key gap is the dissemination of our high-fidelity information to decision makers and stakeholders. We propose a unified, decision support dashboard, “WUI-LLM,” that collates these data into a clear presentation of how built environments across the U.S. interact with flammable wildlands. WUI-LLM will map structure level WUI classifications and fire exposure probabilities and allow users to interact with these data using a large-language model enhanced query system to allow for on-the-fly spatial analysis. Our dashboard will remove technical barriers in quantifying community risk to wildland fire and how that risk has changed over time.

Zul Kazeem, PhD Student
Case Western Reserve University

Ayomide Zul Kazeem is a graduate researcher specializing in critical infrastructure resilience and environmental risk management. Focusing on water infrastructure, Ayomide develops advanced computational models to assess vulnerability, simulate hazard impacts, and optimize recovery strategies. Her work integrates network analysis, machine learning, and reinforcement learning to support data-driven decision-making in infrastructure planning and disaster response.

She has experience modeling natural hazard scenarios, including wildfires, and their cascading effects on urban systems. Her research contributes to practical tools for leak detection, fire spread modeling, and infrastructure maintenance prioritization. Beyond computational research, Ayomide collaborates with multidisciplinary teams to translate complex simulations into actionable policies for urban planning, environmental safety, and public infrastructure resilience.

Committed to bridging the gap between advanced analytics and real-world applications, Ayomide emphasizes practical strategies to enhance system reliability under extreme conditions. She regularly presents her work at conferences and partners with academic and industry stakeholders to advance resilient infrastructure solutions globally.

Poster: Is It There Yet? Mapping Wildfire Spread Pathways and Connectivity for Community Risk Reduction

This study presents a computational framework that combines physics-informed wildfire spread modeling, dynamic connectivity analysis, and targeted fuel treatment. The model represents heterogeneous landscapes using fuel, moisture, wind, slope, aspect, and elevation data, then identifies critical pathways that allow fire to move between connected fuel clusters. An adaptive declustering strategy selectively treats important connection points to interrupt fire transmission while preserving most of the landscape. In the proof-of-concept trial, targeted treatment reduced burned area by 93.2%, peak heat by 71.1%, and total energy release by 95%, while eliminating cross-cluster spread. The framework supports more strategic wildfire mitigation and future community-resilience planning.