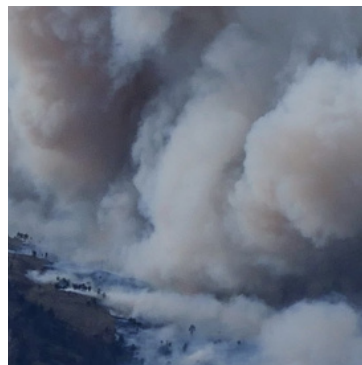


SFPE Educational & Scientific Foundation *2023 Annual Report*

To enhance the scientific understanding of fire and its interaction with the social, natural, and built environments, towards the vision of engineering a resilient, sustainable, fire-safe world for all.



Contact Us

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Letter from the Chair of the Board of Governors

The SFPE Foundation celebrates its 44th birthday this year by kicking off our Annual Campaign! For the last 44 years, the SFPE Foundation has facilitated research and education that enhances the scientific understanding of fire and its interaction with the social, natural, and built environments toward the vision of engineering a resilient, sustainable, fire-safe world for all.

Thanks to donations like yours, the SFPE Foundation can offer annual technical presentations to 144+ SFPE Chapters globally and free Research in Fire Engineering webinars accessible on our website. (That's six Professional Development Hours at no cost!) These donor-supported programs are increasing access to cutting-edge research and education for members of our community worldwide.

In addition to the webinar series and chapter presentations, the Foundation supports original research and cross-sectoral collaboration through a range of programs, all conducted in service of our new [2022-2025 Strategic Plan](#). Highlights of the past year include:

- Progress on our WUI initiatives, including the release of a new wildland-urban interface ([WUI](#)) [virtual handbook](#) aimed at U.S. fire service personnel, a virtual [WUI Summit](#), and the launch of a new [WUI project](#) targeting science-based engineering training for WUI fire service personnel
- Four new student [scholarship recipients](#), eight new student [research grant recipients](#), and four new summer [scholarship recipients](#)
- The release of three major research reports: one on the [environmental and health impact of fire and fire-suppression activities](#), one on the [impact of climate change on water suppression systems](#), and one on a [risk and performance assessment framework for sustainable and fire-resilient buildings](#)
- The launch of a new major research project focused on the integration of [building information modeling \(BIM\) for fire protection systems](#) in buildings

[Donate online](#) to support the Foundation's mission and help us grow our impact in new and exciting ways. Thanks to a matching gift pledged by [UL Solutions](#) and [UL Research Institutes](#), your donation will be doubled, up to \$25,000 USD.



Peter Senez

Chair, SFPE Foundation Board of
Governors, August 2023

Introduction

Thank you for your interest in the SFPE Foundation! We invite you to browse this full-length 2023 Annual Report, where we cover some of the many highlights from our activities and programs over the past year. To learn more, check out our [website](#), sign up for our [monthly newsletter](#), and follow us on social media ([LinkedIn](#), [Twitter/X](#), [YouTube](#)) so you'll always be informed about new initiatives and opportunities available through the Foundation. To view a short, one-page summary, please check out our *2023 Annual Report Summary*.

Overview

The Society of Fire Protection Engineers (SFPE) established the SFPE Educational and Scientific Foundation in 1979. The SFPE Foundation (or, the Foundation), is a 501(c)(3) organization incorporated in the United States that facilitates research and educational initiatives to advance the scientific understanding of fire in the natural and built environments. With the support of external grants and individual, corporate, and SFPE chapter donations, the Foundation funds professional awards, student scholarships, and research grants; leads cross-sectoral research collaborations; conducts research workshops and meetings; develops new initiatives to support the next generation of fire protection engineers; and disseminates knowledge to advance the field of fire engineering and fire safety science globally. Learn more by reviewing this 2023 Annual Report, and by visiting our website at: www.sfpe.org/foundation/.

It's never been more important to expand access to fire engineering expertise, and we still have much work to do. Turn on the news today, and you'll see evidence of the growing threat of fire and related hazards in the wildland-urban interface, as well as in urban and suburban areas; how heat waves, drought conditions, and even ice storms are impacting the water supplies we depend on for fire suppression and mitigation activities; how the development of new energy technologies creates new fire protection systems design challenges; how new knowledge of human behavior in egress and emergency situations challenges our existing models; and many more areas where fire protection engineering has a role to play. With your support, we continue to fund innovative research and education that expands our knowledge in key areas.



New 2022-2025 Strategic Plan Adopted

In December 2022, the Foundation's Board of Governors adopted a new strategic plan in effect through 2025. Built around the mission of enhancing the scientific understanding of fire and its interaction with various environments, the Foundation aims to engineer a resilient, sustainable, fire-safe world for all. As an affiliate of the Society of Fire Protection Engineers, the SFPE Foundation is collaborating with a myriad of global stakeholders to advance the field of fire engineering. The new plan outlines four pivotal goals: establishing Sustainable Resources through funding and partnerships; prioritizing Diversity, Equity, Inclusion & Access within the field; focusing on Innovation for Impact to meet critical needs; and expanding the Foundation's Global Reach.

This ambitious strategic plan serves as a roadmap for the Foundation's future initiatives and engagements. The goals are meticulously designed to be inclusive, engaging, and impactful. In particular, the Foundation aims to develop sustainable funding resources, cultivate diversity and inclusion in leadership roles, and support groundbreaking research and educational projects. Furthermore, by fostering collaborations with other technical fields and expanding its global reach, the SFPE Foundation is committed to becoming a primary facilitator and disseminator of cutting-edge research and knowledge in fire engineering. This marks an exciting new chapter for the Foundation and its partners, as they collectively strive to create a safer, more equitable world.



New Staff Support

To support our expanding portfolio of projects and initiatives, the SFPE Foundation filled a staff position in late 2022. Please join us in welcoming our newest team member:

Amanda Tarbet, MLIS, Research Manager

Amanda Tarbet is the Research Manager at the SFPE Foundation. She is responsible for supporting the Foundation's research initiatives, including disseminating research outcomes. She also manages the Foundation's academic/university partnerships, including the Academic Leadership Council.

Prior to joining the SFPE Foundation, Amanda was an academic librarian for ten years, and has worked at the MGH Institute of Health Professions, North Shore Community College, Northeastern University, and Boston College. Over the years she has presented at many conferences including the American Library Association Annual Conference, the Association of College and Research Libraries, and Designing for Digital. As an evidence synthesis expert, she has published in journals such as *The Journal of Climate Change and Health* and *Simulation in Healthcare*.

Amanda earned an M.S. in Library and Information Science from Simmons University and a B.S. in Biology and Biotechnology from Worcester Polytechnic Institute. Her professional interests include metascience, open science, research data stewardship, instructional design and teaching, and user experience research and design.



Student Awards and Scholarships

This year, the Foundation gave out four student awards to celebrate the achievements in scholarship of the recipients.

Dr. Guylène Proulx, OC Scholarship

The Dr. Guylène Proulx, OC Scholarship honors Dr. Guylène Proulx, one of the preeminent researchers and communicators in the field of human behavior in emergencies.

Please join us in congratulating the 2023 Dr. Guylène Proulx, OC Scholarship recipient: **Jacob Derrick**, undergraduate student in Fire Risk Engineering at Glasgow Caledonian University, UK, and his faculty advisor, Prof. Kevin Day. Jacob was chosen for his research on behavioral characteristics of neuro-diverse individuals in evacuation scenarios, specifically its relevance to the SFPE Research Roadmap and the direct impact it has on increasing our understanding of human behavior.



Student Scholar Award

The Foundation's Student Scholar Award recognizes outstanding student scholars around the world in support of the science and practice of fire protection engineering. Please join us in congratulating our two 2023 Student Scholar Award recipients: **Pascale Vacca**, PhD, at Universitat Politècnica de Catalunya (Spain), and **Zhuojun Nan**, PhD, at the Hong Kong Polytechnic University (Hong Kong). Congratulations to them both on recently earning their PhDs!



Pascale was selected for her research entitled “Fire Risk Analysis Framework at the Wildland-Urban Interface.” Her work contributes to addressing knowledge gaps in the Wildland/WUI Fires thread of the SFPE Research Roadmap by analyzing fire hazards and building vulnerabilities present at the WUI microscale and developing a risk analysis framework that will help create fire-adapted communities.

Zhuojun Nan was selected for her research “Influence of Localized Failures on Global Response of Steel-Framed Composite Structures in Realistic Fires.” Her work contributes to the Building Fires thread of the SFPE Research Roadmap by investigating how localized failures of a structure on fire can impact the fire-induced progressive structural collapse of an entire building, using modeling, experiments, and artificial intelligence.



Frederick W. Mowrer Global Scholar Award

The aim of the Mowrer Global Scholar Award is to impact safety around the world by supporting students to build fire protection expertise in developing countries with rapidly expanding infrastructure. Endowed by Kathleen Almand, PE, FSFPE, this scholarship honors Dr. Mowrer's impact on the field of fire protection engineering and the development of fire protection engineering as an international academic discipline.



Join us in congratulating the 2023 Frederick W. Mowrer Global Scholar Award recipient: **Oluwatobi Aluko**, PhD student, Universiti Tecknologi Malaysia (Malaysia). His research contributes to addressing knowledge gaps in the Resilience/Sustainability and Building Fires threads of the SFPE Research Roadmap by testing the material performance of a concrete made with kenaf, a biofiber, compared to plain concrete.

Education & Research

Support for Student Projects

Student Research Grants

The SFPE Foundation supports a number of initiatives designed to further its mission to enhance the scientific understanding of fire and its interaction with the social, natural, and built environments. An important part of this mission is developing the next generation of fire protection engineers. The Foundation encourages this through an emphasis on student involvement in large research projects associated with addressing gaps identified in the SFPE [Research Roadmap](#), as well as through the Student Research Grant program.

[Student Research Grant](#) recipients receive \$5,000 USD to support a research project relevant to the field of fire engineering. Proposals are usually accepted in March and October, with two rounds of awards made each year. Please join us in congratulating the November 2022 and March 2023 Student Research Grant recipients.

November 2022



Waseem Hittini (PhD Student, The University of Queensland, Australia) was awarded a student research grant for his project "**Assessment of Flame Spread Models: Level of Complexity of Sub-Models.**" This project seeks to build a greater understanding of the performance of the sub-models in Computational Fluid Dynamic-Pyrolysis models, focusing on determining the capability and source of errors in them.

Xiaoqing Li (Master's Student, University of Science and Technology of China, China) was awarded a student research grant for her project "**Thermal Breakage and Fallout of Tempered Glazing System and Its Interaction with Compartment Fire.**" This project will use experiments and numerical simulations to reveal the breakage and fallout mechanism of tempered glass and the influence of sudden ventilation change caused by glass fallout on the fire evolution and entrainment behavior of compartment fires. The result will be the development of a Computational Fluid Dynamics (CFD) model with consideration of glass fallout.



Anoop Warriar (PhD Student, University of Central Lancashire, United Kingdom) was awarded a student research grant for his project "**Externally Venting Flames (EVF) Dynamics and Development in Non-Orthogonal Geometries.**" This project investigates the mechanism of external fire spread in curvilinear façade systems and their impact on the building with Computational Fluid Dynamics (CFD) modeling and large-scale experimental methods.

Tony Xiao (PhD Student, University of Sydney, Australia) was awarded a student research grant for his project "**Chemically Enhanced Water Mist Suppression of Fires.**" The overall goal of this project is to develop novel experiments to investigate the use of chemically enhanced water mists (doped with small concentrations of non-toxic metal chemical additives like sodium bicarbonate and/or ferrocene) to extinguish buoyant/turbulent flames typical of compartment fires. The data will advance decision-making and modeling by developing a chemical effectiveness map and a quantitative database of suppression effectiveness.



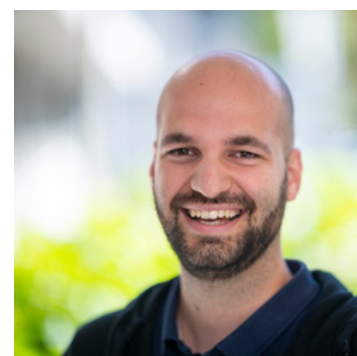
March 2023

Weng Jingwen (PhD Student, Department of Architectural Engineering, City University of Hong Kong) was awarded a student research grant for her project, "**Fire-protection-oriented Battery Safety Management System Based on Artificial Neural Network.**" Although lithium-ion batteries are key to the future of electric vehicles, their tendency to overheat and potentially catch fire is a significant challenge. Using a combination of computer simulations and artificial intelligence, this study aims to provide comprehensive solutions for battery fire protection.



Nikolaos Kalogeropoulos (PhD Student, Department of Mechanical Engineering, Imperial College London) was awarded a student research grant for his project, "**Evacuation Trigger Boundaries Applied to the Fire Safety of Rural Communities, with AI Acceleration and Applied to a Community in the 2019 Kincade Fire.**" The aim of this project is to develop and improve a probabilistic trigger boundary algorithm to assist with long-term wildfire evacuation planning. Ultimately, the algorithm will become a completely machine learning-based tool.

Nik Rus (PhD Student, Department for Research of Fire-safe Sustainable Built Environment, University of Primorska, Slovenian National Building and Civil Engineering Institute [ZAG]) was awarded a student research grant for his project, "**FireSafePV Materials.**" This project will study the effects of different types of roofing materials on the critical gap height between the roofing membrane and the PV panel in a building-applied Photovoltaic (BAPV) installation. Nik ultimately seeks to improve fire safety of BAPV with these experiments. The FRISSBE project receives funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 952395.

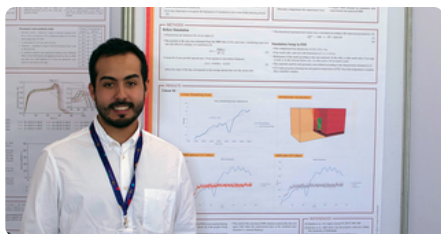




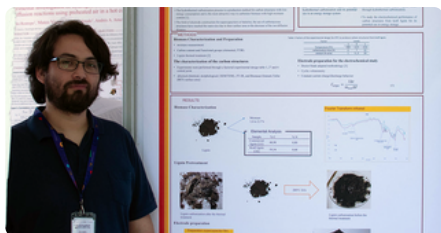
Tanmay Vora (PhD Student, Department of Civil and Environmental Engineering, University of Michigan, USA) was awarded a student research grant for his project, **“Modeling Transport of Firebrands using a Eulerian Multiphase Technique around Structures and Communities.”** The goal of this project is to formulate and experimentally verify and validate a novel computational model for firebrand transport that integrates a Eulerian multiphase model in computational fluid dynamics (CFD) simulations. It will be implemented using OpenFOAM.

2022 APCISS Student Scholars

In 2022, the SFPE Foundation awarded \$5,000 in student scholarships to four participants of the 2nd annual Asia-Pacific Combustion Institute Summer School (APCISS-2) in Chile. In the December 2022 program, South American graduate students learned both theory and practice, attended hands-on workshops, and presented research posters.



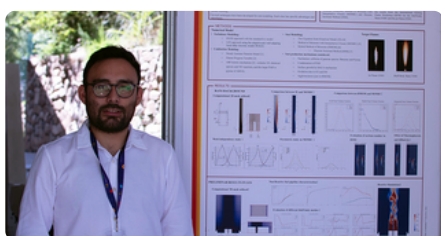
Ignacio Calderón, Pontificia Universidad Católica de Chile, presented “Simulating fire dynamics of timber compartment experiments using computational fluid dynamics.”



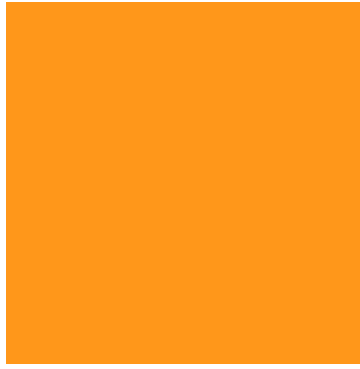
Alejandro Restrepo Román, Universidad de Antioquia (Colombia), presented “Experimental investigation of hydrogen enriched natural gas diffusion reactions using preheated air in a hot co-flow burner.”



Álvaro González, Universidad de La Frontera (Chile), presented “Hydrothermal carbonization of lignin for the production of carbon structures to use on supercapacitors.”



Sebastian Valencia, Pontificia Universidad Católica del Perú, presented “An extensive comparison of soot formation models applied to non-premixed turbulent flames in a LES context.”



Global Reach in Research

SFPE Foundations Student Research Grant, Award, and Scholarship recipients hail from all over the world. The next generation of fire researchers is poised to have a global impact.



40

Students

15

Countries



Research

Awards & Recognition

The Foundation also seeks to support research by awarding major contributions to the field. Read on to learn about the 2023 Award winners.

Arthur B. Guise Medal

Initiated in 1982, the Arthur B. Guise Medal recognizes eminent achievement in the advancement of the science and technology of fire protection engineering and is named in memory of the achievements of Arthur Guise, who singularly developed dry chemicals for use as fire extinguishing agents. The achievement may be in research, development, design, innovation, management, education, or literature.

Please join us in congratulating the 2023 Arthur B. Guise Medal recipient: Bart Merci, PhD, Full Senior Professor at the Faculty of Engineering and Architecture at Ghent University, and founder and director of the International Masters in Fire Safety Engineering (IMFSE) program, who has played a pivotal role in elevating computational fluid dynamics models for combustion, fire, smoke, and more. Professor Merci is a leading figure in fire research, and he serves as co-editor-in-chief of *Fire Safety Journal*.



His contributions to the modeling of fire behavior are widely recognized as industry-leading. He started to study fires via RANS/LES simulations of diffusion jet flames, which subsequently included pressure effects (compartment fires in nuclear plants), buoyancy and smoke movement (for tunnels and atria), thermal degradation of the condensed phase (for flame spread and burning of fuels), and water droplet interactions (for first principle predictions of fire suppression) among many other physical and chemical phenomena present in his models. His simulations are, in the opinion of one of his nominators, “the state of the art in fire science.”

His publication portfolio includes more than 130 journal papers. At the same time, his nominators praised his engagement with teaching and training the next generation of fire engineering professionals. “As program director for Ghent University’s International Master of Science in Fire Safety Engineering (IMFSE) with over 200 alumni, he nurtures a close alumni network across the globe that promotes fire safety engineering and its acceptance. The IMFSE program is clearly based on the SFPE model curriculum and core competencies. The students who come out of this program bring very good competencies and can easily be integrated into companies and put to projects in a very short time!”

Jack Bono Award for Engineering Communication

Established in 1994, the Bono Award is named after Jack A. Bono, a Fellow and Past President of the Society who worked at Underwriters Laboratories, Inc. (UL) for 44 years. This award recognizes the author(s) of the paper published in the SFPE journal, *Fire Technology*, during the prior year that has most contributed to the advancement and application of professional fire protection engineering.

Please join us in congratulating the 2023 Jack Bono Award for Engineering Communication co-author recipients:



Silvia Arias,
Division of Fire
Safety
Engineering,
Faculty of
Engineering,
Lund University,
Sweden



Axel Mossberg,
Bengt Dahlgren
Fire Research,
Sweden



Daniel Nilsson,
Civil and Natural
Resources
Engineering,
University of
Canterbury,
New Zealand



Jonathan
Wahlqvist, Division
of Fire Safety
Engineering,
Faculty of
Engineering,
Lund University,
Sweden

Their article, “A Study on Evacuation Behavior in Physical and Virtual Reality Experiments,” is in *Fire Technology*: <https://doi.org/10.1007/s10694-021-01172-4>

Research

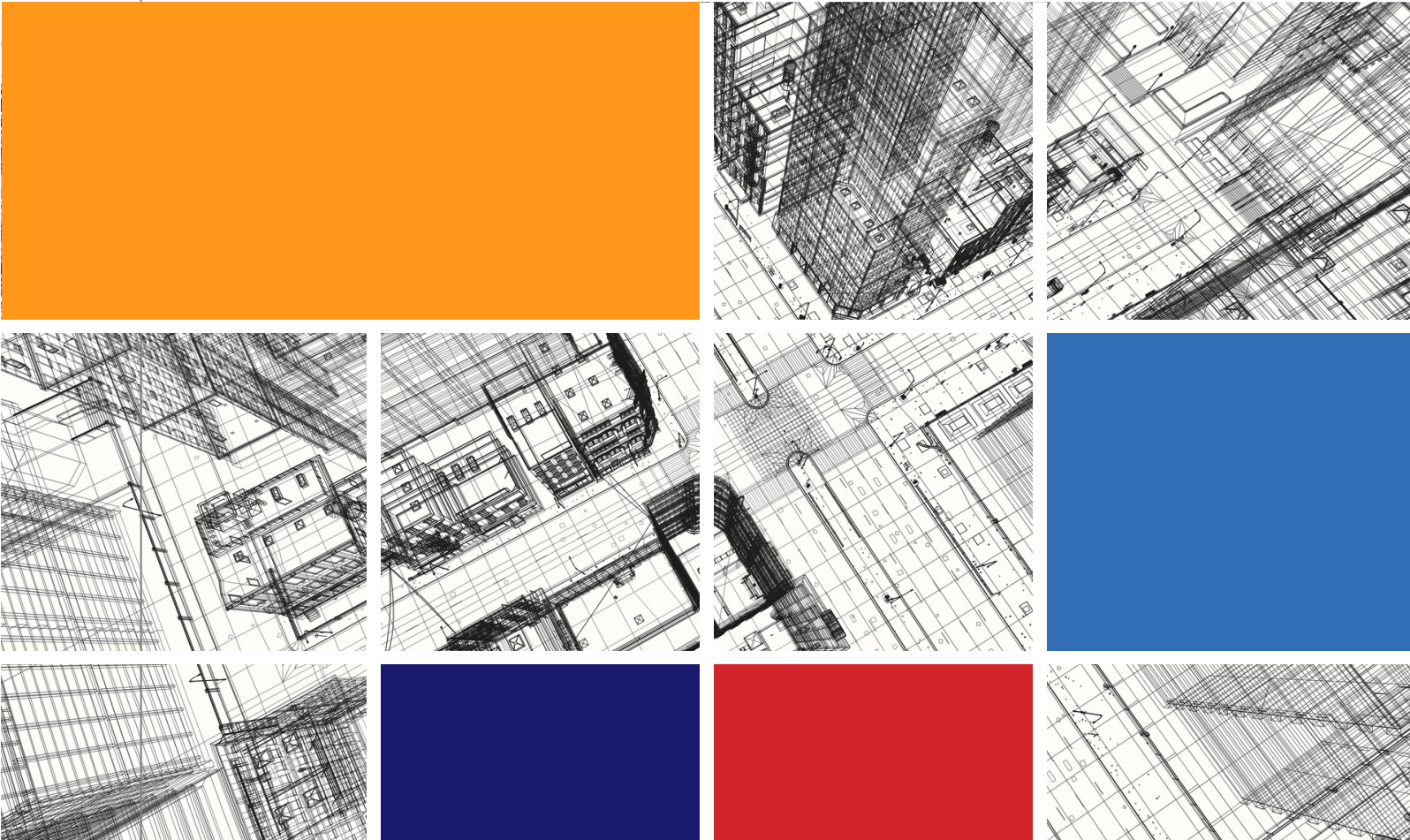
Advancing Science Through Grantmaking

Projects Active in 2023

Integration of Fire Protection Systems in Building Information Modeling

The primary objective of this research project is to identify opportunities to update and develop new fire protection engineering data repositories available to all interested parties while also identifying interoperability requirements that will help more fire protection engineering software tools better integrate with BIM. In addition, the research aims to identify opportunities for improved toolsets and workflows that integrate with BIM. The goal is to make it easier for all stakeholders to design, verify, and maintain proper fire safety systems in buildings. Leading the research is Principal Investigator Stephen Roth, PE, President and Chief Technology Officer at [Carmelsoft](#). The project will wrap up in late 2023 and be presented at the 2023 SFPE Annual Conference in Bethesda, MD.

The project contributes to the **Building Fires** and **Fire Service** threads of the SFPE Research Roadmap.



Engineering Science for the Fire Service: Developing a WUI Risk Assessment & Mitigation Curriculum

The SFPE Foundation received a FEMA Fire Prevention & Safety Grant (FY2021) to develop an engineering science-based educational curriculum for fire service personnel that helps address unmet training needs with respect to Wildland-Urban Interface (WUI) fire risk assessment and mitigation. Fire protection engineers can offer educational tools and resources to help support fire departments in the field. These tools can be applied across the spectrum of WUI fire hazards – in areas like individual asset protection, community evacuation and notification, and community-level wildfire protection and mitigation.

This project aims to develop a classroom-based training curriculum (including courses, course content, delivery methodology, and learning assessment) that introduces fire service personnel to engineering-based guidance and tools that can provide more nuanced guidance to fire departments conducting WUI property fire risk assessment and mitigation activities, especially in areas where existing codes, regulations, or tools are not locally contextualized.

A project team from the Mid-Atlantic Center for Emergency Management & Public Safety at Frederick Community College and FireTox LLC was selected to develop the curriculum, and a team from Code Red Consultants was chosen to evaluate the risk reduction potential of the training. To date, all of the pilots have been completed and the curriculum will be presented at the 2023 SFPE Annual Conference.

This project contributes to the Foundation’s research portfolio in the SFPE Research Roadmap threads of **Building Fires, Fire Service, Fire Safety Systems, and Wildland/WUI Fires.**



Projects Completed in 2023

Beyond the Checklist – A Virtual Handbook of Engineering Resources for WUI Property Fire Risk Assessment and Mitigation

This project was made possible with federal funding support from the Department of Homeland Security's Federal Emergency Management Agency's Fire Prevention & Safety Grant Program (FY2020). This project aimed to develop a virtual handbook of engineering-based resource materials to support fire department WUI property fire risk assessments and recommended mitigation strategies for use in the field. A project team from Jensen Hughes, led by Darlene Rini, PE, was selected for this project. The project was supported by an Advisory Panel composed of fire engineers, fire service personnel, and members of SFPE's Fire Service Subcommittee. Following the December 2021 kick-off workshop, the tool was piloted and evaluated in cooperation with two fire departments in the US. The WUI Virtual Handbook for Property Fire Risk Assessment & Mitigation was completed in early 2023 and can be accessed and downloaded at <https://www.sfpe.org/wuihandbook/home>.

This project contributes to the **Building Fires, Fire Service, Fire Safety Systems, and Wildland/WUI Fires** threads of the SFPE Research Roadmap.



Download free from [sfpe.org/WUIHandbook](https://www.sfpe.org/WUIHandbook)

Risk and Performance Assessment Framework for Sustainable and Fire Resilient Buildings

This project aimed to lay the groundwork for the future development of a wide range of risk-informed performance-based tools for the assessment of sustainable and fire resilient buildings. This involved characterizing the problem, researching and identifying appropriate assessment methods, identifying necessary attributes and requirements for input data, and developing a framework to underpin a risk-informed performance-based assessment methodology. The framework is built on an analysis of regulatory requirements (for fire safety) and green building systems (for sustainability), as well as the creation of an analytical hierarchy process (AHP) risk assessment methodology.

The resultant scores in the SAFR-B framework are based on generous input from international experts in fire safety and sustainability, while the weighting between attributes has been based on the project team's expert input. The resultant proof-of-concept framework has been applied to a fictive case study of an apartment building from Malmö. In May of 2022, the Foundation granted an award to Dr. Brian J. Meacham ([Meacham Associates, USA](#)) and Professor Håkan Frantzich and Professor Margaret McNamee, (both from the [Division of Fire Safety Engineering, Lund University, Sweden](#)) to conduct this study. They were supported by MS student Erik Kimblad (Lund University). The project kicked off in September 2022. The study findings will be presented at the SFPE Annual Conference and Expo in October 2023. The final report is available on the Foundation's website: <https://bit.ly/3QuavMZ>.

This project contributes to the **Building Fires and Resilience/Sustainability** threads of the SFPE Research Roadmap.



Projects Completed in Late 2022

Water Supply & Climate Change: The Impact of Water Stress on Fire Protection Systems

It is widely acknowledged that the impacts of climate change include more widespread and prolonged drought conditions, increased risk of flooding, rising temperatures, reduced snowpack, and shifts in weather patterns globally. Many of these changes not only increase the risk of fire events, but also place additional strain on the public water supplies that are an integral part of many fire protection systems. To design for more resilient communities in this context, fire protection engineers need to understand the linkages between climate change, public water supplies, and fire protection systems design. This project focuses on how fire protection system design and water supply system design must begin to include the concept of climate change, specifically water scarcity or stress, in the discussion of reliability of systems.

Principal Investigator Dr. Virginia R. Charter and Justin Paul Fletcher conducted a detailed literature review of current water supply practices, design of suppression systems that depend upon the use of water supplies, and the impacts of water stress or scarcity on water supply systems, as well as a gap analysis of what areas need to be researched more from the lens of fire protection systems and climate change. Additionally, the report includes four case studies of areas that have experienced water shortages: Winter Storm Uri 2021 in Texas; the 2018 Cape Town, South Africa ‘Day Zero’ water crisis; Spain’s ongoing water crisis; and Australia’s water challenges. By studying these scenarios, the project provides a vast look from rural to urban areas (including the wildland urban interface), as well as differing climates, and varying reasons leading to the water stress or scarcities in the regions. A final source of data is a stakeholder survey focused on plans for and experiences with water shortages. The final report is available on the Foundation’s website: <https://bit.ly/3QuavMZ>.

This project contributes to the **Resilience/Sustainability** and **Fire Safety Systems** threads of the SFPE Research Roadmap.



Environmental and Health Impacts of Fire and Fire-Suppression Activities During Large-Scale Fire Events

The primary objective of this research project is to characterize the environmental and health impacts following large-scale wildland and structural fire events. The primary research includes a literature review, identification of current systems for monitoring large-scale fire incidents, identification of current tools and resources used to quantify the impact of large-scale fire events, and a gap analysis to inform future research. A research team from [FireTox, LLC](#), led by Principal Investigator Jamie L. McAllister, PhD, PE, and Co-Investigator Brendan McCarrick, PE, was selected for this project. Findings of the study were presented at the SFPE Annual Conference and Expo in Detroit, MI, USA, October 12-14, 2022. The final report is available on the Foundation's website: <https://bit.ly/3QuavMZ>.

This project contributes to the **Resilience/Sustainability, Fire Service, and Wildland/WUIFires** threads of the SFPE Research Roadmap.

FINAL REPORTS and other public project-related materials for completed Foundation-funded projects are available on the Foundation's [website](#). All large research projects, such as those listed above, also include a one-hour webinar presentation, available through the SFPE Foundation's new open access [Research in Fire Engineering webinar series](#).

SFPE Chapters may also request virtual chapter presentations on research topics of interest to their membership by contacting Aimee Zube, Donor Relations Manager, at AZube@sfpefoundation.org.



Thank you to the SFPE Chapters that Hosted a Foundation Presentation in 2022



Research Initiatives

Advancing Science Through Collaboration



Grand Challenges Initiative

The SFPE Foundation's Grand Challenges Initiative (GCI) is a three-year flagship program launched in early 2022 that brings together industry, academia, research institutes, government agencies, nonprofits, and other stakeholders to develop a coordinated plan for action on pressing global issues. Our approach is to begin with topics that are not unique to fire engineering, but instead represent global challenges where fire safety science and engineering can contribute to ongoing discussions that affect the daily lives of billions. We conducted interviews and small group discussions, and we polled the SFPE community, fire experts, and other stakeholders from around the world to decide on the GCI's four focus areas, each constituting its own Working Group:

1. Energy & Infrastructure
2. Resilience & Sustainability
3. Climate Change
4. Digitalization, and Artificial Intelligence, & Cybersecurity

Since the Grand Challenges Summit in April 2022, the four Working Groups have met monthly to investigate their topic areas and develop a publish a 10-year plan for coordinated action in the form of a white paper. The timelines include targeted research projects, outreach, and educational initiatives. The white papers were published on the SFPE Foundation website in July 2023, kicking off the 2023 GCI Virtual Summit which occurred on four dates in July and August. During the virtual meetings, the GCI fellows and Chairs presented the outcomes of their respective Working Groups and answered questions from attendees. The Summit sessions were recorded and are available for playback online. The public can submit feedback and comments on the white papers through October 31, 2023.

With 30+ GCI Founding Partner organizations and growing, the GCI will move into the implementation phase in January 2024, bringing together GCI partners and invited stakeholders to begin to put the 10-year plans into action.

GCI Founding Partners

As of August 1, 2023

Luminary



Platinum

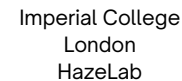


Gold



Silver

Academic & Research Partners



Wildland-Urban Interface (WUI) Working Group Initiative

In January and February 2022, the SFPE Foundation kicked off the Wildland-Urban Interface (WUI) Working Group Initiative with initial planning meetings. For the past year, the WUI Working Group has been developing an outline of the areas where fire engineering can contribute to addressing the problem of fire and related hazards in the WUI. This draft “Table of Contents” for a theoretical WUI Fire Engineering Handbook set out to define the scope and range of areas where fire engineering expertise can contribute globally.

Throughout 2023, the three modules of the Working Group (Individual Asset Protection, Community Evacuation & Notification, and Community Wildland Fire Protection) worked on that draft in regular meetings. The module leads presented their progress for feedback from the broader community and external stakeholders at the SFPE Foundation Virtual WUI Summit in February and March 2023.

WUI Working Group Leadership:

Co-chairs: Albert Simeoni (WPI, USA) & Alexander Maranghides (NIST, USA)

Module 1: Individual Asset Protection

- Elsa Pastor, CERTEC (Spain)
- Pedro Reszka, Universidad Adolfo Ibáñez, (Chile)
- Pascale Vacca & Elsa Pastor, CERTEC (Spain)

Module 2: Community Notification & Evacuation

- George Braga, Federal District FD (Brazil)
- Max Kinateder, National Research Council Canada (Canada)
- Rino Lovreglio, Massey University (New Zealand)

Module 3: Community Wildland Fire Protection

- Domingos Viegas, University of Coimbra (Portugal)
- Dee Withee, Colorado Springs Fire Department (USA)



New FEMA FP&S Grant

FEMA has awarded the SFPE Foundation a FEMA 2022 Fire Prevention and Safety grant, including \$217,000 USD in federal funding, for the project: *WUI Education and Awareness Beyond Parcel-Level Risk Assessment & Mitigation: Engaging Fire Service & Community Stakeholders*. The new project builds on our previous work with the WUI Virtual Handbook and connects to our ongoing efforts with the WUI Working Group Initiative and WUI Curriculum for the Fire Service.

Research demonstrates the complexity of the WUI fire problem, while also highlighting critical gaps in available tools and resources. Recent efforts by fire departments to assess WUI property fire risks and recommend mitigation strategies tend to focus on hardening single structures. Yet, mounting evidence shows that parcel-level fire risk assessment must incorporate the broader exposure context, including community-level factors. Fire protection engineers can help WUI fire departments by providing guidance and reference materials for audiences at different levels of the WUI fire problem. This project will address this need by creating an expanded WUI Virtual Handbook with updated and new content, a template for risk assessment based on best practices, and a robust suite of supporting materials to help fire service personnel communicate with property owners and community leaders about fire risks and parcel-level and community-level mitigation strategies to reduce WUI fire losses.

This project will contribute to the Foundation's research portfolio in the SFPE Research Roadmap threads of **Building Fires, Fire Service, Fire Safety Systems,** and **Wildland/WUI Fires.**



Research Dissemination & Education

Research in Fire Engineering Webinar Series

The SFPE Foundation administers the Research in Fire Engineering webinar series, which hosts presentations from leading scholars and practitioners of fire safety science and fire protection engineering worldwide. Presentations feature SFPE Foundation grant-funded projects and research from faculty and students at fire engineering programs affiliated with the Academic Leadership Council (ALC). Thanks to our donors, we can make these webinars freely available and offer 1 PDH credit for attendance.

In 2023, the Foundation hosted four webinars with researchers whose projects we funded:

- *Water Supply and Climate Change: The Impact of Water Stress on Fire Protection Systems* by Virginia Charter
- *Beyond the Checklist: A Virtual Handbook of Engineering Resources for WUI Property Fire Risk Assessment and Mitigation* by Alex Cooper
- *Environmental and Health Impacts of Fire and Fire Suppression Activities During Large-Scale Fire Events* by Jamie McAllister
- *Risk and Performance Assessment Framework for a Sustainable and Fire Resilient Building Environment (SAFR-BE)* by Margaret McNamee, Hakan Frantzich, and Eric Kimblad

Since the webinar series started in 2021, over **1200** people have attended them live, and another **600+** have streamed a recording.



RESEARCH IN FIRE ENGINEERING WEBINAR SERIES

PRESENTED BY THE SFPE FOUNDATION

Dissemination

Beyond the webinar series, the SFPE Foundation engages in numerous activities to disseminate results from Foundation-funded research projects. Many grant recipients attend SFPE and SFPE Foundation-sponsored conferences and events and present their findings in that context.

For instance, 2020 Student Grant Recipient Diego Alvarez-Coedo presented his project "On the Study of the Three-Dimensional Region of a Multi-Scale Methodology for Tunnel Fires" at the 2022 SFPE International Performance-Based Codes & Fire Safety Design Methods Conference, and 2020 Student Grant Recipient Francesca Lugaresi presented her project "Thermal Response of Curtain Wall Systems Exposed to Fire" at SFPE 2022 Annual Conference & Expo.

Additionally, the SFPE Foundation assists grant recipients in publishing their results in SFPE publications, like the FPE eXTRA, which dedicated its April 2023 issue to an [article](#) by 2021 Student Grant Recipient Juliette Franqueville on the results of the first phase of her project "Deep Learning for Flame Characterization in Compartment Fires."

Academic Leadership Council

SFPE and SFPE Foundation's [Academic Leadership Council](#) (ALC) is comprised of representation from the leaders of fire protection and fire safety engineering and engineering technology programs worldwide. The ALC fosters communication between the Society, the Foundation, and the universities that educate the next generations of fire protection engineering professionals. It also facilitates the sharing of information amongst the global academic community and provides an opportunity for collaboration and partnerships on larger and broader initiatives.

In 2022, the ALC distributed a survey to its members intended to collect department strengths. There were 14 responses from 8 different countries. In addition to various degrees offered (BS, MS, PhD, minors, and individual courses), respondents reported having access to labs of all sizes and specific equipment such as cone calorimeters and burn test rigs. The most commonly reported research area strengths were fire dynamics and human behavior/egress. The ALC is still discussing how best to utilize this data.

The ALC also met in July 2023 to hear preliminary results from the GCI white papers and share their feedback on the 10-year plans. Many ALC members are also GCI partners, but not all, which is why it was important to hear from the ALC directly regarding their wisdom on educational and research components of the GCI plans.

How to Support Our Work

The Foundation continues to make an impact internationally due in large part to our many generous donors. Our donors include corporations, SFPE Chapters, and individuals. The Foundation is very grateful to every donor for their support and confidence, regardless of the amount donated. Every dollar counts! The Foundation is a charitable 501(c)(3) organization incorporated in the United States of America. If you contribute, you should consult a tax advisor to determine whether your contribution is tax deductible.

Individual Giving

Generous giving by individuals has offered the Foundation stability and opportunities to expand its impact since the very beginning. Individuals can choose from a variety of giving methods that best suit their needs, including:

- Cash or check
- Credit card
- Redirection of SFPE or SFPE Foundation award or honorarium
- Planned giving (i.e., life insurance policy/equity; retirement plan assets, bequest provisions, etc.)

To give online, login and contribute through the [donation portal](#). Contact Donor Relations Manager Aimee Zube (AZube@sfpefoundation.org) to learn more about how you can donate to support our work, including planned giving options and major gifts.



Corporate Giving

Corporations can give at least \$5,000 annually and receive special recognition as follows:

- Kilowatt Level: \$5,000 - \$9,999
- Megawatt Level: \$10,000 - \$24,999
- Gigawatt Level: \$25,000 or more

The mission of the SFPE Foundation is to enhance the scientific understanding of fire and its interaction with the social, natural, and built environments. There are hundreds of corporations whose mission aligns or overlaps with that of the Foundation. A number of corporations give to the Foundation at each of the three levels, and we are very grateful for their trust and support. We invite other corporations and industry leaders who benefit from the Foundation's work to also give generously and become a Kilowatt, Megawatt, or Gigawatt Level supporter.

Corporate donors are given grateful recognition on the Foundation's website, during the Foundation's presentation at the Annual Business Meeting, and during the SFPE Annual Conference & Expo.

Chapter Giving

SFPE Chapters can support the SFPE Foundation by giving whatever amount the chapter membership feels is appropriate. Through giving, Chapters can contribute to the advancement of fire protection education and science in a way that is sustainable and has global reach. Any amount is welcome, and no amount is too small. Chapters that donate receive credit toward the SFPE Chapter Excellence Award (ACE) program, during the Foundation's presentation at the Annual Business Meeting, and during the SFPE Annual Conference & Expo.

Directing Your Donation for Maximum Impact

The Foundation offers several funds to which you can direct your donation to achieve an impact that is most meaningful and important to you:

- Robert W. Fitzgerald Challenge Fund
Every dollar donated and directed here will be matched up to \$2,500 annually through 2026. This is a great way to multiply your donation. This fund is used to support the Proulx Scholarship Award, which bestows \$5,000 annually to a student (and their advisor) engaged in a research project in the field of human behavior related to fire or emergencies.
- UL Solutions and UL Research Institutes Matching Campaign
Every dollar donated by an individual or an SFPE Chapter and directed to the Annual Fund or the Robert W. Fitzgerald Challenge Fund will be matched by UL Solutions up to a maximum of \$25,000 annually.
- Annual Fund
Every dollar donated and directed here will be used by the Foundation at the discretion of the Board of Governors to further the mission of the Foundation.
- Student Travel Fund
Donations to the Student Travel Fund will support the disbursement of travel stipends to individuals receiving honors, awards, and/or scholarships, including invitations to present at SFPE and SFPE Foundation-affiliated in-person events and any related operational expenses. Funds are awarded to individuals who can demonstrate a need and show that they will be used for travel expenses.

Planned Giving

New: SFPE Foundation Legacy Society

The Legacy Society honors individuals who have included the SFPE Foundation in their will, trust, charitable planned gifts or other significant endowed gifts in the creation of scholarships and awards. As a member of the Legacy Society, you find yourself among a circle of friends who see the value in planning to support research, education, and outreach that advances our understanding of fire and ensures that future generations will thrive in a fire-safe world. If you are considering a gift to the SFPE Foundation in your estate plans, we encourage you to contact Aimee Zube, Donor Relations Manager, at AZube@sfpefoundation.org to discuss your vision and ideas.

Trying to decide whether it's a good fit? Hear from a current Legacy Society member, [Jeff Harrington](#), on why he chose to donate to the SFPE Foundation:

"In my time with the Foundation as a Governor, I have seen impressive results. The Foundation Board of Governors and SFPE [Foundation] leadership have earned my trust. [...] [The Foundation] has proven to be a very good steward of the donations it receives, using them effectively and creatively in support of its mission."

Jeff Harrington, Former Vice Chair, SFPE Foundation Board of Governors

If you have already included the SFPE Foundation in your plans, it would be our honor to personally thank you and welcome you into the Legacy Society. Please contact Aimee Zube, Donor Relations Manager at AZube@sfpefoundation.org to be added as a Legacy Society Member.

How to Give

- Online:
 - To give online, go to <https://sfpe.users.membersuite.com/donations> and select your desired options.
 - Or, give directly through our PayPal donation portal at: https://www.paypal.com/donate/?hosted_button_id=G9RRQXLS3YFWU.
- Check by Mail:
 - Make check payable to “SFPE Educational & Scientific Foundation, Inc.” and send to:

SFPE Educational & Scientific Foundation Inc.
Attn: Donations
9711 Washingtonian Blvd. Suite 380
Gaithersburg, MD 20878

Note: in the memo line on the check, indicate the direction for your donation (i.e., Annual Fund, Fitzgerald Fund, Student Travel Fund, etc.).

You may also call Aimee Zube, Donor Relations Manager, to have your gift processed over the phone. She may be reached at: +1 301-915-9722.



Individual Donors from 2022

We gratefully thank and recognize the following for their generosity in supporting the SFPE Foundation. This support ensures the Foundation's programs, including vital grants and scholarships, are sustained. Our educational and scientific research efforts would not be possible without you. 100% of our Board of Governors donate to support the SFPE Foundation!

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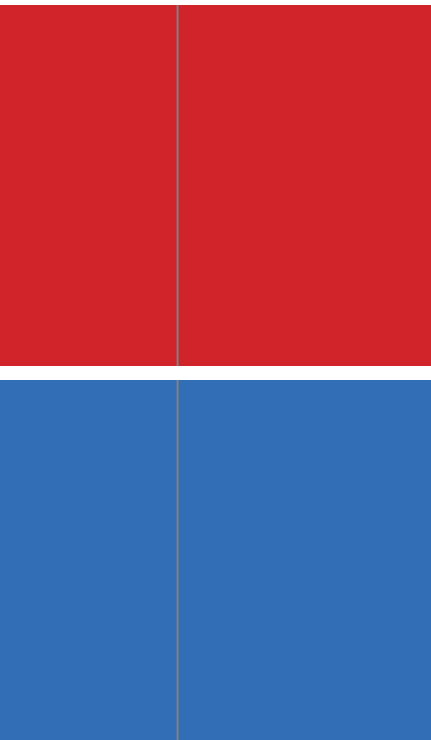


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Thank You

Together we can engineer a resilient, sustainable,
and fire-safe world for all.

 www.sfpe.org/foundation