

International Association for Fire Safety Science

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Fire Safety Science News

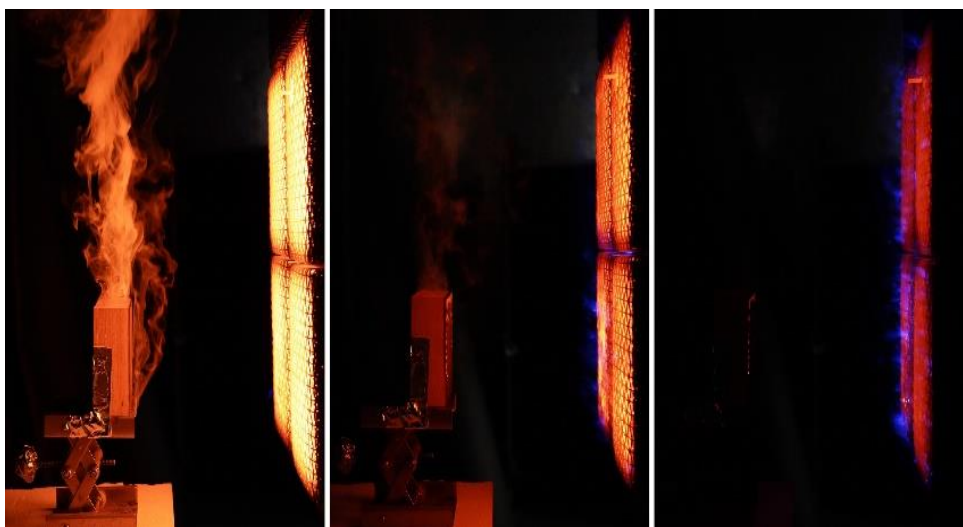
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October 2023, Issue No. 50

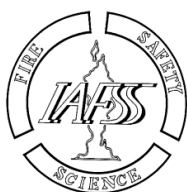
Editors:

Xinyan Huang, Hong Kong Polytechnic University

Nils Johansson, Lund University



Ignition Process under Irradiation (PolyU HK)



IAFSS was founded in 1988 with the primary objective of encouraging research into the science of preventing and mitigating the adverse effects of fires and of providing a forum for presenting the results of such research

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Our Aims

Fire Safety Science News aims to be a platform for spreading the work of IAFSS members, and to be the place where fire safety scientists can read what is not readily found elsewhere, thus favoring news and trending research. A digital archive of previous issues can be found [online](#).

IF YOU HAVE NEWS TO POST TO THE WEBSITE

The newsletter only comes out twice a year, but the IAFSS website is always available for current association news and information. If you have information that you'd like posted on the website, contact the team of webmasters at webmaster@iafss.org and they'll help you out.

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LETTER FROM THE CHAIR



As I sit down to draft this message, which will be my last as IAFSS Chair, I find myself reflecting on all that IAFSS is able to do, especially for being such a small organization. This is all because of you – an engaged IAFSS member. You are the core of IAFSS, and I sincerely thank you for all that you do for our profession and our Association.

Without a membership comprised of dedicated volunteers, like yourself, who are passionate about advancing fire safety science and engineering, and sharing their knowledge with others, we would not have an Association. Without you, we would not have the upcoming 14th IAFSS Symposium in Tsukuba, Japan, which will share research advancements from across the broad spectrum of fire safety science and engineering and provide numerous opportunities for networking and learning. Without you we would not have the various

Committees and Working Groups of IAFSS that bring members and others together to share research, help advance our early career members, and more. Thank you for being an engaged member!

As I consider what IAFSS has accomplished over the past 2.5 years, I think it is amazing. From putting on a virtual symposium during a global pandemic, to restructuring and reregistering the Association with the UK Charity Commission, to developing and launching a new website, to planning our upcoming symposium, there has been a lot of exceptional work undertaken by many of you to get us to this point. Many thanks once again to Prof. Beth Weckman, her team at University of Waterloo, and the 13th Symposium Planning Committee for pulling off a great 13th symposium during the pandemic. A sincere thank you as well to the leadership and many members of the 14th Symposium Planning Committee and Local Organizing Committee for putting together what promises to be an exceptional set of workshops, papers / presentations, posters, images, and events in Tsukuba in October. Planning for a post-pandemic event had its own challenges, and the Committees have done a great seeing this event come to fruition. With more than **400 registrants so far**, this will be a well-attended event.

I would also like to sincerely thank Prof. Xinyan Huang and Barb Waronek for all of their work in facilitating our new website. This was a tremendous effort, and the resulting website has been a very helpful in promoting our Association as well as in serving you, our members. I also would like to thank the Trustees and the Membership Advisory Council (MAC) for their many contributions to all of our efforts over this time. In particular, I sincerely thank Chair of the Governance Committee, Prof. Beth Weckman, for leading our restructuring effort and transition to a CIO Honorary, Treasurer, Prof. Margaret McNamee, for leading us in transitioning between financial institutions, and the Prof. Charles Fleischmann for his support as Honorary Secretary. Perhaps most of all, I thank Barb Waronek, outgoing Secretariat for her extraordinary efforts to facilitate the new website, see us through UK Charity Commission registration, and more. Thank you, Barb. It was a pleasure working with you over these past few years.

Our Association also suffered losses during my time as Chair. Perhaps the biggest impact to me personally was the recent loss of our former Newsletter Editor, co-chair of our Outreach & Communications Committee, and leader in the areas of fire risk data, data for evacuation modelling, and evacuation modelling, Dr. Rita Fahy. In addition to her professional accomplishments, Rita was an exceptional person – always willing to help, mentor and guide students and early career researchers. I know that I am not alone in having benefited greatly from knowing and collaborating with Rita. The Human Behaviour in Fires Working Group will have a tribute to Rita at their workshop in Tsukuba, which we will share with you in the first Newsletter after the Symposium. In addition, we invite you to share your memories of Rita with us for publication in the next Newsletter as well.

Before I sign off as Chair, I would also like to reflect on where we go from here, both as an Association and within fire safety science and engineering. As of the time of this article, **we have a total membership of just over 1000 and growing**. As best as I can tell, this is the highest membership total in IAFSS history! This includes 724 full-dues members and 290 student members (paying and free). This is an increase of some 300 members since 2021. It is also by all accounts the most diverse membership we have had. Special thanks to Dr. Jason Floyd and our DEI Committee for helping us find ways to reach a more diverse membership, and to our Early Career Researchers and Professionals Committee for their efforts to bring in more early career members.

As we meandered our way through the pandemic, it was not clear what the future of IAFSS would be. Many in the association business were projecting a decline in associations such as ours, due to generational difference, waning interest, time conflicts and more. To see us with a stronger and more diverse membership and incoming leadership than we have ever had, I am enthusiastic about the future. Our new structure puts more members in leadership positions, creates more opportunity for diversity in that leadership, and puts more of the future direction into the hands of members. I look forward in particular to what our Early Career Researchers and

Professionals Committee can help us do to facilitate more opportunities for the next generations – the future of IAFSS. I look forward to big things from IAFSS for years to come.

While our Association has grown, so too have the myriad fire problems that we are collectively trying to tackle. Climate change is causing numerous significant challenges for our planet and its inhabitants. Wildfires are increasing in frequency and magnitude. The loss of life and cultural heritage is irreplaceable. The economic, ecological and social costs are enormous. We still face growing challenges with aging populations, fire properties of emerging sustainable building materials and technologies, increasing presence of battery-powered mobility devices and associated fires, and more. As humanity looks to travel farther in space and to expand habitation off planet, the need to protect life, property and mission from fire takes on new levels of criticality. The challenges of fire and the need to understand it and control for it will never go away. **More than ever there is a need to expand fire safety science and engineering academic, research and practice.** We need to encourage more academic programs, more students to sign up in them, and more companies, governments and NGOs to invest in fire safety. **We need more scientists and engineers creating solutions for a sustainable and fire resilient future.** Daunting challenges for sure, but ones that IAFSS members are geared up for and ready to face head on.

Your efforts to advance fire safety science and engineering around the world, to reduce the risks and impacts of unwanted fire, and importantly, in making IAFSS the leading voice in these areas, is greatly appreciated and continuously needed. Keep up the great work and see you in Tsukuba and beyond!

Signed: Brian Meacham, Chair IAFSS, Meacham Associates, USA

MEMBERSHIP REGISTRATION

Both current and new members can easily register online at www.iafss.org. Current members: please sign-in before registering to maintain your account!

Next year, when we ask you to renew your membership in IAFSS, you will see that the fees have increased from £25 to £50 per year. We recognize this will seem to be a very large increase; however, the need for higher membership dues is being driven by a number of factors.

First, look at all the benefits that you get for your membership fee! These include:

- Free online access to the Fire Safety Journal – the official journal of IAFSS (the new dues approximately equal the cost for two FSJ articles)
- Free access to all prior IAFSS Symposium Proceedings with full papers online
- Discounted registration fees for the IAFSS Symposium (the discount is more than the cost of yearly membership)
- Up-to-date job postings, PhD and post-doc opportunities, and latest news in fire safety science
- Access to, and participation in, working groups with international colleagues such as HBiF, LOF&BE, and MaCFP, including the growing webinar series
- IAFSS Newsletters, where you can share your institution's activities and learn about others
- Access to FRS fire research notes
- A vote in Association affairs
- Opportunities to network with colleagues

Looking forward, we want to do even more! We are currently exploring support for PhD Summer Schools (such as that recently held at the University of Maryland), support for new workshops or webinars, developing and expanding mentoring/networking opportunities for early career researchers, exploring partnerships at other fire related conferences, expanded student travel support to IAFSS symposia and more. Additional suggestions from you, our members, are always welcome. Per our mandate, supported activities will remain those that are beneficial to fire science and fire safety.

As you would guess, providing all that we do, and trying to do more, requires a sound financial footing and increased funding for the organization. A membership fee increase will help significantly with this. The fees for membership in IAFSS have not been changed in over 12 years. At the same time, we have expanded member benefits, upgraded our website, and our fixed expenses continue to rise due to inflation. Coupled to this, IAFSS re-registered with the UK Charity Commission as a Charitable Incorporated Organisation (CIO), which provides us protections over our past form of organization, enhances our ability to accept donations, and brings us into compliance with UK regulations. As a result of becoming a CIO, the organization will incur new, on-going costs associated with ensuring we comply with important regulations around such things as safeguarding members, diversity, equity and inclusion, data privacy and ensuring accessibility of our website.

At present, the reality is that dues cover only a fraction of the organization's expenses. For the remaining costs, IAFSS relies on income from investments and profit from our symposia, which as we learned with COVID-19, can be impacted by unforeseen events. Reliance on these two uncertain revenue streams for fixed expenses is not a best practice, nor does it leave any room for undertaking the many new initiatives that have been suggested by our membership. We hope you understand, and are willing and able to help us continue to do more for you - our members - by continuing your membership next year and beyond, and continuing to volunteer your time for our association and to fire safety science and engineering more broadly. Thank you!

Please contact office@iafss.org with any questions about membership or how to register.

New IAFSS Management Committee Elections

The IAFSS thanks all the members that took the time to vote in the election of New IAFSS Management Committee that was closed on 18 September 2023. We would also like to thank all the members that were submitted for nomination for either Trustee or MAC. Our association runs on volunteers and without your efforts we would not exist. Please see the list below.

Trustees

Americas

Albert Simeoni, Worcester Polytechnic Institute, USA

Arnaud Trouvé, University of Maryland, USA

Elizabeth Weckman, University of Waterloo, Canada

Europe, Middle East and Africa

Maria de Las Nieves Fernandez Anez, Western Norway University of Applied Sciences, Norway

Eric Guillaume, Efectis, France

Jennifer Wen, University of Surrey, England

Asia Oceania

Tony Abu, University of Canterbury, New Zealand

Naian Liu, University of Science and Technology of China, China

Yuji Nakamura, Toyohashi University of Technology, Japan

MAC members

Americas

Bronwyn Forrest, University of Waterloo, Canada

Brian Lattimer, Virginia Tech, USA

Sara McAllister, US Department of Agriculture, USA

Shuna Ni, University of Maryland, USA

Yi Wang, FM Global, USA

Felix Wiesner, University of British Columbia, Canada

Europe, Middle East and Africa

Natalia Flores-Quiroz, Stellenbosch University, South Africa

Rory Hadden, University of Edinburgh, Scotland

Thomas Roguame, University of Poitiers, France

Enrico Ronchi, Lund University, Sweden

Dave Rush, University of Edinburgh, Scotland

Wojciech Węgrzyński, ITB, Poland

Asia Oceania

Kazunori Harada, Kyoto University, Japan

Xinyan Huang, Hong Kong Polytechnic University, Hong Kong

David Lange, University of Queensland, Australia

Ken Matsuyama, Tokyo University of Science, Japan

Miho Seike, Hiroshima University, Japan

Yu Wang, University of Science and Technology of China, China

IN MEMORIAM

The IAFSS, and more broadly, the fire safety science and engineering community, has lost a number of important contributors to the science and practice of fire risk and hazard reduction over the past few months. I want to take this opportunity to reflect on a few of these key people and their impacts on the field.

Richard L.P. Custer

Richard (Dick) Custer was a researcher, educator and fire safety consultant extraordinaire. He held a variety of positions at the US National Bureau of Standards (now NIST) in the 1970s, including chief of the fire detection and control group and associate director of the Center for Fire Research. His seminal work with colleague Richard Bright, *Fire Detection: The State-of-the-Art*, coined the term 'fire signatures' that is widespread today, and facilitated significant research on fire detection methods in the 1980s and beyond. His career in academia started as a lecturer in Fire Protection Engineering at the University Maryland in the later 1960s. In the 1980s and 1990s he was an associate professor and associate director of the Center for Firesafety Studies at Worcester Polytechnic Institute (WPI). Dick was an exceptional teacher and mentor, guiding numerous students through research, and engaging them in his consulting practice, which had a focus on forensic fire investigation and performance-based design for fire. He served for many years as chair of the NFPA 921 Committee (Guide for Fire and Explosion Investigations). He taught the first SFPE short courses on performance-based design for fire and was co-author on SFPE's groundbreaking book *Introduction to Performance-Based Fire Safety*. Dick was one of the four original section editors of the *SFPE Handbook of Fire Protection Engineering*, co-authoring a chapter on *Design of Detection Systems*, and was a former member of the SFPE Board of Directors. He had his own consulting firm for a number of years, and although based in the US, spent time in Switzerland, Italy and elsewhere collaborating on projects, and went to Australia to be Technical Director for the Fire Code Reform Centre. He later joined Arup, where he was involved in a wide range of efforts, from the WTC investigation to significant casino projects in Macau, where he also spent considerable time.

Dr. Robert Zalosh

Robert (Bob) Zalosh, an industrial fire protection engineer and explosions expert, had a significant impact on the reduction of industrial fire risks. Bob spent many years at Factory Mutual Research Corporation (now FM Global), where he served in various positions, culminating as the head of the Applied Research Department. While at FM, he started teaching at Worcester Polytechnic Institute (WPI), and in 1990, became a full-time professor of Fire Protection Engineering. While at WPI, Bob authored the textbook, *Industrial Fire Protection Engineering*, considered the definitive book of the field. He also co-authored the Center for Chemical Process Safety's Guidelines for Safe Handling of Powders and Bulk Solids. Most recently, he co-authored *Explosion Dynamics: Foundations and Practical Applications*, which was published this June. During his tenure as a professor, Bob founded Firexplo, a consulting practice. He conducted fire and explosion investigations and served as an expert witness in ensuing litigation. Firexplo's clients included small businesses, large corporations, and government agencies such as the Chemical Safety Board and OSHA. He advised clients on hazards related to flammable gases and combustible dusts and provided guidance on safety strategies and protections. Bob, a professor emeritus, was a fellow of the Society of Fire Protection Engineers and of the American Institute of Chemical Engineers. He was a member of the fire council at Underwriters Laboratory for 25 years, of the Hydrogen Safety Panel since its inception, and of several National Fire Protection Association committees. Bob was generous in many ways, finding his pro bono work for fire departments particularly rewarding. In 2016, the Boston Fire Department honored him with the prestigious Fire Commissioner Award for Outstanding Civilian Service.

Dr. Rita Fahy

Dr. Rita Fahy had a long and impactful career in helping people to understand and address risks to life from fire across the spectrum from building occupants to fire service personnel. Rita spent much of her professional career with the National Fire Protection Association (NFPA) in their research division. She was developer of the egress model EXIT89. She was a leader in the area of human behavior and fire, in particular around understanding, collecting and analyzing responses to fires and events. Rita was a member of the group that organized the Human Behaviour in Fire conference series from its start back in 1998. She worked closely with Dr. Guylene Proulx and many others on model verification, post-event interviews, and evacuation data issues, among many other significant contributions. Rita also taught courses at Lund University and was a guest lecturer at Worcester Polytechnic Institute in the course, People and Fire. She mentored many young researchers in human behavior, evacuation modeling, fire statistics, and related areas. Rita was a longstanding member of the US TAG to ISO TC92 SC4, and of the International Association for Fire Safety Science (IAFSS). For IAFSS, in addition to serving on the Managing Committee and more recently the Membership Advisory Council, Rita was the long-time editor of the IAFSS Newsletter, most recently co-chair of the IAFSS Outreach and Communication Committee. She had been an active supporter of the IAFSS Symposium for many years, including reviewing papers, organizing workshops, giving papers, mentoring young researchers, and more. Rita's passing is a significant loss for all who had the pleasure to know her and work with her, personally and professionally, as well as to our broader fire safety

science, engineering, and human behavior community. The IAFSS invites members to share their memories of Rita for inclusion in a future IAFSS Newsletter.

Signed: Brian Meacham, Chair IAFSS, Meacham Associates, USA

14th International Symposium on Fire Safety Science

The 14th IAFSS Symposium will be held at the Epochal Tsukuba International Congress Center, Tsukuba, Japan in 22-27th October 2023. A 2-day (Sat-Sun) workshop will be held during 21-22th October as pre-symposium event. Saturday WS will be held at Hotel Nikko Tsukuba, whereas Sunday WS will be held at the symposium venue. All events are taken place in-person format; which enables us directly meet and discuss physically beyond the long pandemic which suffers academic activities and personal interactions. We are truly welcoming delegates from around the world at Tsukuba in beautiful and calm weather season.

Symposium Venue

Tsukuba International Congress Center (**Epochal Tsukuba**)

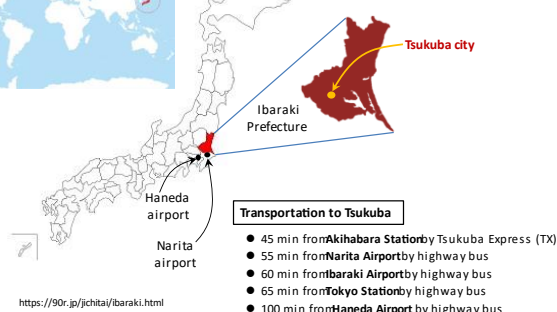


- A core facility for research exchanges in Tsukuba Science City
- 10 min walk from the Tsukuba Station (TX)



<http://www.conferencecenter.jp/detail/tsukuba.htm>
<https://www.ieee-jp.org/section/tokyo/chapter/GIS-29/apsar2013web/venue.html>

Tsukuba, Ibaraki, Japan



The symposium venue is 10 min walking distance from Tsukuba station, where is the final destination of Tsukuba Express Train (called “TX”) from metropolitan area of Tokyo. TX takes you from Akihabara (Sub-culture city at Tokyo) to Tsukuba about 45 min. Also it is easy to access from/to two major international airports such as Narita (NRT) or Haneda (HND), suggesting that the easy-access for all international guests. At late October, the leaf-color change season just begins and you may enjoy beautiful scenery of The Tsukuba Mountain. Around Tsukuba (along the way to Akihabara), there are many nice places to visit; for instance, beautiful natures, historical shrines, temples, Beer brewer, sub-cultures (e.g., Manga, Anime) etc; we ensure to satisfy any guests in various aspects. Rich accommodations are available nearby the Tsukuba station (or one/two stations away from Tsukuba) to bring comfortable stays during the symposium. You can find many Izakaya (Japanese-style casual bar) around the venue to enhance to build a friendship.

Pre-symposium event: Workshop

Workshops, held as pre-symposium event during 21-22, Oct., will run for 2-days, including 12 WGs such as, Compartment Fire, Battery Fire Safety, Facades, Education, Timber, and AI/ML in Fire Safety Engineering (on 21st OCT at Hotel Nikko Tsukuba), and MaCFP-3, Human Behavior, Humanitarian Fire Safety, LOF&BE (EME, IRC), Structure, and Advancements in Fire Safety Engineering and Performance Based Design (on 22nd OCT at symposium venue). We will lunch the first poster session by MaCFP-3 for WS on 22nd OCT. Attendance of WS needs an additional payment (8000 JPY for 1-day and 15000 JPY for 2-days), which is accepted online registration till Oct 6th.

Technical Program

Symposium will start with Welcome reception in Sunday evening (22nd OCT), where we can meet in-person before the symposium starts. Technical session starts from Monday to Friday (23rd OCT to 27th OCT). We have one plenary talk by Emmon’s lectureship winner, Prof. David Purser, and five invited talks by Profs. Akizuki (Japan), Liu (China), Planas (Spain), Stoliarov (US) and Wen (UK), at Convention Hall and all are allocated in the morning session. The historical three parallel sessions are designed for oral presentation, including award winner talks. We hit the record of the total submission at this time and accepted 150 papers for oral presentation (acceptance rate is 44%). In addition to that, 256 of poster and 44 of image submissions will be presented. Other events (DEI, Early-career meetings) will be held on Monday and Wednesday evening, respectively. Award ceremony and symposium banquet will be held on Thursday evening at Hotel Grand Shinonome. Lab tour to Building Research Institute (BRI; national lab located in tsukuba area) will be planned at Friday afternoon. Program-at-a-glance is

available at [symposium website](#); you are most welcome to visit. Detail program will be available in soon. Thank you for your kind patience!

In Tsukuba symposium, we attempt to introduce new service; so called “video viewing service”. With this service, all registered guests can view all oral presentations as “on demand” for 6 months after the symposium. Note that this service will be available only after the symposium. If you could not attend the symposium due to some difficulties, you still have chance to register the video viewing service with some charge (member: 15,000 JPY, non-member: 30,000 JPY) to enjoy the presentations on your desk.

At present (20th Sept), more than 350 guests have been registered. Online registration is still available till 6th Oct. Even pass the online registration due, onsite registration is also available; your kind participation is highly welcome!

We cordially invite you to attend 2023 IAFSS Symposium on Fire Safety Science in Tsukuba, Japan. See you all soon.

Signed: Ritsu Dobashi, The University of Tokyo (Chair of Local Organizing Committee, 14th IAFSS)

14th Symposium Committees

IAFSS Chair:

- Dr. Brian Meacham, Meacham Associates, USA

Symposium Planning Co-Chairs:

- Professor N. Liu, University of Science and Technology of China, China
- Professor A. Stec, University of Central Lancashire, UK
- Professor A. Trouvé, University of Maryland, USA

Local Organizing Committee

- Professor R. Dobashi, The University of Tokyo, Japan
- Professor K. Kuwana, Tokyo University of Science, Japan
- Professor Y. Nakamura, Toyohashi University of Technology, Japan

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- Dr. W. Węgrzyński, Building Research Institute, Poland
- Professor J. Wen, University of Warwick, UK
- Dr. Y. Xin, FM Global, USA
- Dr. D. Zeng, FM Global, USA

Updates from IAFSS working groups

Measurement and Computation of Fire Phenomena (MaCFP) Working Group

Objectives and General Workshop Overview:

The MaCFP Working Group is inviting all members of the fire research community to attend its third workshop (MaCFP-3) to be held on Sunday October 22, 2023, from 9:00 to 17:50 (lunch will be provided). Like the previous two workshops (see <https://iafss.org/macfp>), MaCFP-3 will be aimed at building a common framework between experimentalists and modelers to make systematic progress in fire modeling. The workshop will feature comparisons of experimental data and computational results obtained in selected target configurations corresponding to gaseous, liquid and solid-fueled flames. These representative fire problems are the current focus of the Gas Phase Phenomena and Condensed Phase Phenomena subgroups. The workshop will include a poster session and will provide time for open discussion and interactions. The workshop will also feature presentations led by the newly created Radiative Heat Transfer Phenomena subgroup.

Scope and Format of Workshop:

Target configurations to be discussed at MaCFP-3 will include:

- Liquid pool fires and gaseous burners (30 cm, 37 cm, and 100 cm diameter; featuring multiple fuels) – experiments performed at NIST and at the University of Waterloo;
- Controlled co-flow round diffusion flame experiments (13.7-cm diameter diffusion flames; featuring four fuels - methane, ethylene, propylene, and propane - and featuring an oxygen-nitrogen oxidizer) – experiments performed at FM Global;
- Benchmark gasification experiments of MaCFP PMMA – bench-scale thermal degradation experiments conducted in the NIST gasification apparatus, providing validation data for PMMA pyrolysis models;
- Flame spread experiments in a 1.46 m tall corner wall configuration – experiments performed at the University of Maryland with MaCFP PMMA (based on the Single Burning Item (SBI) Test, EN13823);
- Flame spread experiments in a 2.44 m tall parallel panel configuration – experiments performed at NIST with MaCFP PMMA (based on the FM4910 Parallel Panel Test).

MaCFP-3 Session/Case	Session Co-Chairs; Technical Point of Contact
NIST-Waterloo-Pool-Fires	Tarek Beji , Ryan Falkenstein-Smith ; Anthony Hamins , Beth Weckman
FM-Burner	Ning Ren , Gang Xiong ; Yi Wang
NIST-Gasification	Jason Floyd , Bjarne Husted ; Isaac Leventon
UMD-SBI	Dushyant Chaudhari , Alexander Snegirev ; Stanislav Stoliarov
NIST-Parallel-Panel	Lukas Arnold , Kevin McGrattan ; Isaac Leventon

The MaCFP repository hosted on GitHub (<https://github.com/MaCFP>) contains all available experimental data corresponding to these different configurations as well as guidelines for the participating computational modeling groups.

For questions on the GitHub MaCFP repository, contact Randy McDermott (randall.mcdermott@nist.gov)

For general MaCFP questions, contact Bart Merci (bart.merci@ugent.be) and Arnaud Trouvé (atrouve@umd.edu)

MaCFP-3 Workshop Agenda/Schedule (Sunday October 22, 2023)

Epochal Tsukuba International Congress Center (Convention Hall 200 – 2F)

(Registration deadline: October 6, 2023)

9:00-9:30 am	Welcome remarks and summary of outcomes from MaCFP-2 Summary of MaCFP Target Fire Phenomena (B. Merci, A. Trouvé)
9:30-10:30 am	NIST-Waterloo-Pool-Fires configuration (presentation of results and open discussion) (T. Beji, R. Falkenstein-Smith)
10:30-11:30 am	FM-Burner configuration (presentation of results and open discussion) (N. Ren, G. Xiong)

11:30 am-1:00 pm	<i>Lunch break and Poster Session</i>
1:00-2:00 pm	NIST-Gasification-Apparatus configuration (presentation of results and open discussion) (J. Floyd, B. Husted)
2:00-3:00 pm	UMD-SBI configuration (presentation of results and open discussion) (D. Chaudhari, A. Snegirev)
3:00-3:15 pm	<i>Coffee break</i>
3:15-4:15 pm	NIST-Parallel-Panel configuration (presentation of results and open discussion) (L. Arnold, K. McGrattan)
4:15-5:00 pm	Radiative Heat Transfer Phenomena subgroup (F. Brännström, S. Hostikka)
5:00-5:50 pm	Summary of Outcomes of MaCFP-3 Next steps, future MaCFP meetings, concluding remarks (I. Leventon, R. McDermott)

Large Outdoor Fires and the Built Environment (LOF&BE) Working Group

The International Association for Fire Safety Science (IAFSS) established the permanent working group known as LOF&BE (Large Outdoor Fires and the Built Environment), as an outgrowth of the 2017 Lund Workshops held in conjunction with the 12th IAFSS Symposium. LOF&BE aims to bring the community together to tackle large outdoor fire problems such as wildland fires, wildland-urban interface (WUI) fires, urban fires, and informal settlement fires. LOF&BE started with three subgroups - Ignition Resistant Communities (IRC), Emergency Management and Evacuation (EME), and Large Outdoor Fire Fighting (LOFF). The IRC subgroup is focused on developing the scientific understanding that will lead to new standards, testing methodologies, and mitigation strategies indicative of large outdoor fire exposures, including the ones from wildland to communities and within communities. The EME subgroup is focused on developing the scientific basis for effective emergency management strategies for communities exposed to large outdoor fires. The LOFF subgroup is providing a review of various tactics that are used, as well as the various personal protective equipment (PPE), and suggests pathways for research community engagement, including environmental issues in suppressing these fires.

Gentle Reminder – Seeking New IRC sub-leader and Fire Service Advisory Panel (FSAO) Members

As part of our continued growth plans in IAFSS LOF&BE, we are establishing a Fire Service Advisory Panel (FSAP) to help bridge the gap between fire management and fire research. We have suspended the LOFF subgroup activity for the time being. The FSAP will be of great help to our subgroups; we expect valuable input to guide our future activities! Any IAFSS member interested in joining the panel is asked to send a CV along with relevant experience with the fire services to co-chairs Sara McAllister (sara.mcallister@usda.gov), Sayaka Suzuki (suzuki.s.dq@m.titech.ac.jp), and Samuel L. Manzello (manzello@tohoku.ac.jp; manzello@reaxengineering.com).

If you are interested to become an IRC sub-leader with Alex Filkov, please send a CV and brief statement on why you would like to take on this role in IAFSS LOF&BE to the co-leaders, Sara McAllister, Sayaka Suzuki, and Samuel L. Manzello. Applications will be accepted until the position is filled. Thanks, again to David Rush, University of Edinburgh, stepping down after the IAFSS symposium, for service to IAFSS LOF&BE!

Special Issue Published in *Combustion Science and Technology* on Importance of Combustion Science to Unravel Complex Large Outdoor Fire Processes

Sayaka Suzuki and Samuel L. Manzello guest edited a special issue on the importance of combustion science to unravel complex large outdoor fire processes for *Combustion Science and Technology*. All the papers have now been published and appeared. The guest editors dedicated this special issue to the memory of Mr. John Randy Shields (picture to the right), recently deceased. Mr. Shields was a geologist by training and worked in the fire research division at NIST for more than two decades. SLM and SS learned a great deal from Randy, not only about experiments but also on how to be sure you live your life doing what you believe is right. Randy was always glad to lend a helping hand and give advice to anyone that would ask. In the photo published in the editorial, Randy is working at the Building Research Institute in Japan, with SLM, preparing for firebrand shower experiments. Randy really loved Japan and the warm Japanese people. We really miss you, Randy.

The range of invited authors in this special issue is substantial and includes more than 50 authors working across multiple continents. To read the editorial and papers, please see here: [Combustion Science and Technology: Vol 195, No 13 \(tandfonline.com\)](#)

Manzello Appointed Visiting Professor at Tohoku University (東北大学)

Samuel L. Manzello has accepted a visiting professor position at Tohoku University, within the Institute of Fluid Science (IFS). Tohoku University, known as *Tohokudai*, is a Japanese National University. It is the third Imperial University in Japan, established in 1907 ([Tohoku University](https://www.tohoku.ac.jp/)). Samuel L. Manzello will be collaborating with Professor Kaoru Maruta, the Director of the IFS and an internationally known combustion scientist. To learn more about our group at IFS, please see here. [メンバー | 丸田・森井研究室 / 中村研究室 \(tohoku.ac.jp\)](#). Samuel L. Manzello will be using a dual affiliation with Reax Engineering, USA, and is currently based in Tokyo, Japan.



If interested in collaborations, please reach out to me at Samuel L. Manzello (manzello@tohoku.ac.jp)

Management Team

IAFSS LOF&BE Co-Leaders

Samuel L. Manzello, Reax Engineering, USA and Tohoku University, Japan
Sara McAllister UDSA Forest Service, USA
Sayaka Suzuki, Tokyo Institute of Technology, Japan

Ignition Resistant Communities (IRC) Subgroup Leaders

Alex Filkov, University of Melbourne, Australia
David Rush, University of Edinburgh, UK

Emergency Management and Evacuation (EME) Subgroup Leaders

Rahul Wadhvani, HK PolyU, China
Yu Wang, USTC, China

Fire Service Advisory Panel (FSAP)

Haonan Chen, USTC and Henan Fire and Rescue Brigade, China
Robert Cook, Tesco UK Fire Safety Manager, UK
Ethan Foote, CALFIRE, Retired, USA
Charles Scawthorn, University of California at Berkeley and SPA Risk LLC, USA

Activities Planned for IAFSS 2023 in Tsukuba, Japan

IAFSS LOF&BE will be holding a series of two workshops as part of the 14th IAFSS Symposium in Tsukuba, Japan. The dates of the IAFSS LOF&BE workshops are planned just before the 14th IAFSS. One will be hosted by the IRC subgroup and the other will be hosted by the EME subgroup. Table 1 is the final schedule.

LOF&BE: EME workshop (Sunday Oct 22nd)

Time	Contents	Speakers
20 min	Introduction to LOF&BE	Manzello & McAllister & Suzuki (co-Leaders)
30 min	Progress on EME	Wadhvani & Wang (EME subGLs)
30 min	Discussion	All participants
30 min	Short presentations	Flores-Quiroz & Walls, Wu
30 min	Discussion	All participants
10 min	Wrap up	

LOF&BE: IRC workshop (Sunday Oct 22nd)

Time	Contents	Speakers
20 min	Introduction to LOF&BE	Manzello & McAllister & Suzuki (co-Leaders)
30 min	Progress report on IRC	Filkov & Rush (IRC subGLs)
30 min	Discussion	All participants
30 min	Short presentations	Penman, Rush, Yoshioka & Himoto & Kagiya, Vacca
30 min	Discussion	All participants
10 min	Wrap up	

Invited Speakers (in an alphabetical order)

- Trent Penman (University of Melbourne)
- Pascale Vacca (Universitat Politècnica de Catalunya)
- Chia Lung Wu (Chang Jung Christian University)
- Natalia Flores-Quiroz/Richard Walls (Stellenbosch University)
- Hideki Yoshioka (The University of Tokyo)/Keisuke Himoto (National Institute for Land and Infrastructure Management)/Koji Kagiya (Tohoku Institute of Technology)

Large Outdoor Fires & the Built Environment Working Group Publications. Two new publications have appeared!

B. Y. Lattimer, X. Huang, M. A. Delichatsios, Y. A. Levendis, K. Kochersberger, S.L. Manzello, P. Frank, T. Jones, J. Salvador, C. Delgado, E. Angelats, E. Parès, D. Martín, S. McAllister, and S. Suzuki, Use of Unmanned Aerial Systems in Large Outdoor Firefighting, *Fire Technology*, 2023. <https://doi.org/10.1007/s10694-023-01437-0>

A. Filkov, V. Tihay-Felicelli, N. Masoudvaziri, D. Rush, A. Valencia, Y. Wang, D. Blunck, M. Valero, K. Kempna, J. Smolka, J. De Beer, Z. Campbell-Lochrie, F. Centeno, M. A. Ibrahim, C. Lemmert, and W. C. Tam, A Review of Thermal Exposure and Fire Spread Mechanisms in Large Outdoor fires and the Built Environment, *Fire Safety Journal*, Volume 140, October 2023, 103871. <https://doi.org/10.1016/j.firesaf.2023.103871>

Large Outdoor Fires & the Built Environment Working Group Publications

N. Elhami Khorasani, M. Kinatader, V. Lemiale, S.L. Manzello, I. Marom, L. Marquez, S. Suzuki, M. Theodori, Y. Wang, and S. Wong, Review of Research on Human Behavior in Large Outdoor Fires, *Fire Technology*, published, 2023. <https://doi.org/10.1007/s10694-023-01388-6>

Y. Wang, R. Wadhvani, S. Suzuki, M. Theodori, E. Asimakopoulou, J. De Beer, N. Flores, M. A. Ibrahim, H. Johanna, K. Kampna, S. L. Manzello, A. Sharma, J. Smolka, A. Wickramasinghe, C. L. (Farian) Wu, and T. Xia, Case Studies of Large Outdoor Fires Involving Evacuations Part 2, *Emergency Management & Evacuation (EME) Subgroup, Large Outdoor Fires & the Built Environment (LOF&BE) Working Group of the International Association for Fire Safety Science*, 2022 May. <https://doi.org/10.5281/zenodo.6544760>

E. Ronchi, S. Wong, S. Suzuki, M. Theodori, R. Wadhvani, S. Vaiciulyte, S. Gwynne, G. Rein, M. Kristoffersen, R. Lovreglio, I. Marom, C. Ma, D. Antonellis, X. Zhang, Z. Wang, and N. Masoudvaziri, 'Case Studies of Large Outdoor Fires Involving Evacuations', *Emergency Management & Evacuation (EME) Subgroup, Large Outdoor Fires & the Built Environment (LOF&BE) Working Group of the International Association for Fire Safety Science*, 2021 February. <https://doi.org/10.5281/zenodo.4504853>

S. Suzuki, S. McAllister, S.L. Manzello, A. Filkov, D. Gorham, X. Huang, B. Lattimer, and M. Theodori, Large Outdoor Fires and the Built Environment (LOF&BE): Summary of Virtual Workshop, *NIST SP 1263*, 2020. <https://doi.org/10.6028/NIST.SP.1263>

S.L. Manzello, S. McAllister, S. Suzuki, R. Blanchi, E. Pastor, and E. Ronchi, Large Outdoor Fires and the Built Environment (LOF&BE): Summary of Workshop at Interflam, *NIST SP 1241*, 2019. <https://doi.org/10.6028/NIST.SP.1241>

S.L. Manzello, S. McAllister, S. Suzuki, R. Blanchi, E. Pastor, and E. Ronchi, Large Outdoor Fires and the Built Environment: Summary of Kick-Off Workshop, *NIST SP 1236*, 2019. <https://doi.org/10.6028/NIST.SP.1236>

S.L. Manzello, S. McAllister, and S. Suzuki, Large Outdoor Fires and the Built Environment: Objectives and Goals of Permanent IAFSS Working Group. *Fire Technol* **54**, 579–581 (2018). <https://doi.org/10.1007/s10694-018-0717-Z>

S.L. Manzello, S. McAllister, and S. Suzuki, Large Outdoor Fires and the Built Environment: Objectives and Goals of Permanent IAFSS Working Group *Fire Safety Journal* **98**, 1-2 (2018). <https://doi.org/10.1016/j.firesaf.2018.03.003>

S.L. Manzello, R. Blanchi, M. Gollner, D. Gorham, S. McAllister, E. Planas, E. Pastor, P. Reszka, and S. Suzuki, Summary of Workshop Large Outdoor Fires and the Built Environment, *Fire Safety Journal*, **100**, 76-92, (2018). <https://doi.org/10.1016/j.firesaf.2018.07.002>

S.L. Manzello, R. Blanchi, M. Gollner, S. McAllister, E. Planas, G. Rein, P. Reszka, P., and S. Suzuki, Summary of Workshop Large Outdoor Fires and the Built Environment, *NIST SP 1213*, 2017.
<https://doi.org/10.6028/NIST.SP.1213>

Signed: Samuel L. Manzello, Sara McAllister, and Sayaka Suzuki (IAFSS LOF&BE Co-Leaders)

Human Behaviour in Fires (HBiF) Working Group

Our IAFSS Human Behaviour in Fires (HBiF) group now includes over 360 members. The activities of the group are well underway, and we are currently focused on two tasks. The first task concerns the development of a research roadmap for our field and the second is a webinar series to promote the exchange of knowledge.

Regarding the research roadmap, work is proceeding well on exploring and documenting the research gaps in our field and performing a bibliometric analysis of the HBiF domain. In late September and early October two online workshops have been arranged to identify the research obstacles that contribute to research gaps in the field. We plan to report on our progress during a workshop arranged for the 2023 IAFSS Symposium. During this event, we will also present a memorial for Dr Rita Fahy, a world-renowned expert in our field who recently passed away. This will give us the opportunity to discuss the impact that Dr Fahy's research and educational activities have had on Human Behaviour in Fires, including her seminal work on topics like egress modelling, the panic misconception and designing occupant behavioural scenarios.

Our webinar series is continuing, and recordings of our past events are available on the working group's YouTube channel, where we are approaching a milestone of 3,000 views. You can subscribe to our YouTube channel here: <https://www.youtube.com/channel/UCSqMIEaZ08r5BrT0b5q2d0Q>

It is important to note that we have been in contact with the European Commission so that our webinar series is now also being advertised in the European Union Civil Protection Knowledge Network.

Our most recent webinars are:

Webinar 7 – Evacuation of preschool children: What makes it special? – by Hana Najmanová, Czech Technical University in Prague

Recording: <https://www.youtube.com/watch?v=0HynlhSB0tY>

Webinar 8 – From disability to heterogeneity: Understanding pedestrian movement in crowds – by Paul Geoerg, Fire Protection Association Germany

Recording: <https://www.youtube.com/watch?v=8VqSft4spcl>

Follow us:

Twitter: @HBinFire

LinkedIn: <https://www.linkedin.com/groups/14004136/>

We would like to thank all task group leads for the research roadmap:

Natalie van der Wal, Delft University of Technology, The Netherlands

Erica Kinkel, Delft University of Technology, The Netherlands

Milad Haghani, University of New South Wales, Australia

Ruggiero Lovreglio, Massey University, New Zealand

Mary Button, Delta Fire Engineering Ltd, UK

Kate Kapalo, Western Fire Chiefs Association, USA

Signed:

Erica Kuligowski (RMIT University, Australia) - erica.kuligowski@rmit.edu.au

Enrico Ronchi (Lund University, Sweden) - enrico.ronchi@brand.lth.se

Fire Safety Journal: The official journal of IAFSS

Fire Safety Journal is the official journal of IAFSS. Its scope is purposefully wide, as it is deemed important to encourage papers from all sources within this multidisciplinary subject. Research covers a range of topics including but not limited to:

- Fire chemistry and physics

- Fire dynamics (including gas explosions)
- Active fire protection systems, including detection and suppression
- Passive fire protection methods
- People/fire interactions (physical, physiological and psychological)
- Fire safety management
- Assessment and quantification of fire risk (including acceptability of risk)
- Fire investigation
- Fire safety design (including consumer items, industrial plant, transportation, buildings)
- Fire safety legislation
- Fire safety education.
- Original contributions relating to any of the above topics are invited, particularly if they incorporate a quantitative approach to the subject in question.

Editors are Luke Bisby and Bart Merci

Link to [Fire Safety Journal \(ScienceDirect\)](#)

THE 2023 PHILIP THOMAS MEDAL OF EXCELLENCE

Philip Thomas Medal of Excellence is awarded to the author(s) of the best paper presented at a previous IAFSS Symposium. The award consists of a silver medal and a plaque for each author. The medal is cast from the reverse of a silver tetradrachma minted in Athens in 400 BC, at the time of Socrates and Plato. The central images are an olive spring, symbolising peace, and an owl, symbolizing wisdom. The international synergism of our Association is reflected in this Athenian design, suspended from a ribbon of Gosen white silk, presented in a medal box from the San Francisco mint.

The 2023 Philip Thomas Medal of Excellence for the best paper at the 13th IAFSS Symposium (2021) is awarded to Carmen Gorska, Juan P. Hidalgo and Jose L. Torero for their paper “Fire Dynamics in Mass Timber Compartments”, <https://doi.org/10.1016/j.firesaf.2020.103098>. The paper explores the applicability of classical compartment fire dynamics to compartments constructed using engineered wood products. The effect of burning timber surfaces has been studied performing 24 medium-scale timber compartment fire tests. The results are of considerable interest and importance for understanding the burning behaviour of timber and its contribution to the total heat release rate.

The award will be presented at the 14th IAFSS Symposium in Tsukuba, Japan, 22–27 October 2023.



Carmen Gorska



Juan P. Hidalgo



Jose L. Torero

IAFSS SHELDON TIEZEN STUDENT AWARD

These Awards are sponsored by the International FORUM of Fire Research Directors (<http://fireforum.org/>), a group composed of the Directors of fire research organizations throughout the world, which aims to reduce the burden of fire (including the loss of life and property, and effects of fire on the environment and heritage) through international cooperation on fire research. The award recognizes excellence in an IAFSS symposium paper in fire safety science by a student making a significant contribution to that paper.

- David Meyer – Charles Darwin University, Energy and Resources Institute, Australia; Orion Fire Engineering, Australia.
- Antoine Bouffard – Direction R&D EDF, France; Aix-Marseille Université, France.
- Luke de Schot – Department of Civil and Natural Resources Engineering, University of Canterbury, New

Zealand.

- Arthur Rohaert – Division of Fire Safety Engineering, Lund University, Sweden.
- Priya Garg – University of California, Berkeley, USA.
- Linhao Fan – School of Mechanics and Safety Engineering, Zhengzhou University, China.
- Nikolaos Kalogeropoulos – Department of Mechanical Engineering, Imperial College London, UK; The Leverhulme Centre for Wildfires, Environment and Society, UK.
- Tianwei Chu – Department of Building Environment and Energy Engineering, The Hong Kong Polytechnic University, Hong Kong.

International FORUM of Fire Research Directors Awards

The International FORUM of Fire Research Directors has selected the recipients for the 2023 Sjölin and Mid-Career Researcher Awards.

THE FORUM SJÖLIN AWARD

The FORUM Sjölin Award recognizes an outstanding contribution to the science of fire safety or an advance in the state of the art in fire safety engineering practice of extraordinary significance. It is presented to the individual or group whose efforts are primarily responsible for or traceable to the specified advance. The prize consists of a plaque and an honorarium. Recipients of the award are selected annually and the awards are delivered at the triennial symposia of the International Association for Fire Safety Science, IAFSS.

The FORUM selected **Prof. Margaret McNamee**, Lund University, as the recipient of the 2023 Sjölin Award in recognition of her outstanding achievements in several fields of fire safety science, including the environmental impact of fires, emissions from fires, smoke toxicity, wildfire hazards, and smoke detection. The FORUM especially acknowledges Prof. McNamee's research on modelling topical issues relating to fire safety and sustainability, e.g., life-cycle assessment, cost-benefit analysis, scaling and risk assessment. Much of this work was unique when first published, and many other researchers have applied the developed models after their initial publication.

THE FORUM MID-CAREER RESEARCHER AWARD

The FORUM Mid-Career Researcher Award recognizes exceptional achievement and demonstrated leadership in the fields of fire safety science or fire protection engineering made by those in mid-career. It is intended to honor an individual, who is between the ages of 35 and 50 at the time of nomination. The prize consists of a plaque and an honorarium. Recipients of the award are selected annually, and the awards are delivered at the triennial symposia of the IAFSS.

The FORUM selected **Dr. Sara McAllister**, USDA Forest Service, as the recipient of the 2023 Mid-Career Researcher Award. With this award, the FORUM is recognizing her pioneering research which has helped bridging the gap between the wildland fire and fire protection engineering communities. The FORUM especially acknowledges Dr. McAllister's ground-breaking experimental research on ignition criteria for live and dead wildland fuel materials, exploration of the poorly understood problem of convective heating of live and dead forest fuels, and extending knowledge and theory of burning rates of porous wildland fuel beds.

The International FORUM of Fire Research Directors is a group of directors or technical leaders of comparable stature of fire research organizations throughout the world. The FORUM aims to reduce the burden of fire (including the loss of life and property, and effects of fire on the environment and heritage) through international cooperation on fire research.

Dr. Ahmed Kashef

Chair of the FORUM Awards Committee

Dr. Tuula Hakkarainen

Immediate Past Chair of the International FORUM of Fire Research Directors

NEWS FROM MEMBERS

News submitted by members are included in this section, the contributions are not arranged in any specific order. Editorial edits have been made in the submissions.

ARUP

UK Department of Transport EV Guidance

“The full transition to electric vehicles will be one of the most important actions to achieve the UK’s net zero target by 2030. However, the fire hazards of electric vehicles are not addressed within contemporary fire safety guidance. Together with the Department for Transport, Arup have developed interim guidance to help integrate evidence-based fire safety considerations to the wider installation of charge points in existing enclosed car parks. With this guidance, car park owners and operators can make evidence-based fire safety interventions for the benefit of not only their users, but the planet.

You can read more about Arup’s involvement here: [Arup develops fire safety guidance for EVs in covered car parks - Arup](#) and the guidance document can be accessed directly from [gov.uk](#) here: [Covered car parks: fire safety guidance for electric vehicles - GOV.UK \(www.gov.uk\)](#)”

IAFSS Symposium

A series of workshops are to be held prior to the forthcoming IAFSS Symposium to be held in Tsukuba, Japan in October 2023. One of the workshops will be led by Chris Jelenewicz (SFPE) and Peter Johnson (Arup) that is focused on the contributions of fire research to the advancement of fire safety engineering and design of buildings and infrastructure. The first part of the workshop will examine more recent advancements in fire safety engineering practice. The second part will look forward to what might be the future priorities for fire research, given the needs of fire safety engineers as designers in practice, and for the developers of performance based and prescriptive building codes. A number of engineers and researchers will give short presentations to highlight key issues, followed by moderated discussions involving all workshop participants.

Signed: Kenneth Wynne

University of British Columbia

A new fire safety engineering research group has been established at the University of British Columbia (UBC) in Vancouver, Canada. Dr. Felix Wiesner joined the Department of Wood Science within the Faculty of Forestry at the end of 2022. He is developing a research and teaching program for the fire safety of the sustainable timber-built environment, with a special focus on engineered timber and its use in multi-storey buildings and novel architectural forms. At the same time, Dr. Wiesner continues his research on the use of wood in the Wildland-Urban Interface, a topic that has gained additional prominence with recent intense wildfires in British Columbia. He also maintains a position as an Honorary Fellow at the University of Queensland with multiple ongoing collaborations.

The UBC Fire Safety Research Group has begun to grow. Over the summer and ongoing, Mr. Maanav Bhushan has joined the group as a research assistant to contribute his expertise in coding and data analysis to a Forest Innovation Investment sponsored project to assess measurements from existing compartment fire tests with exposed timber surfaces. In September, Ms. Arwa Abougharib became the group’s first PhD student. Her research will look into the issue of resilience of different engineered timber systems in non-standard compartment fire scenarios. She has previous experience in fire safety research on smoke modeling and the interaction with egress phenomena. Currently, UBC is also hosting Ms. Laura Schmidt from the University of Edinburgh for a short-term scientific mission as part of the Holistic design of taller timber buildings (HELEN) Cost action. At UBC she will evaluate different existing datasets to refine the experimental and reporting approach to smouldering. At the same time, she will have the chance to learn more about wood science and the importance of forestry and lumber products in British Columbia.



Last year, the impact of fire safety at UBC had immediate effects, when the Faculty of Forestry won the Golden Pinecone 2022 Christmas Tree Fire Heat Release Rate Prediction Competition organised by the National Institute of Standards and Technology. A strong showing for combined tree and fire knowledge.

In the figure to the left, Prof. Greg Smith, Dr. Felix Wiesner, and Dr. Delia Murguia (from left to right) proudly presenting the Golden Pinecone from the 2022 Christmas Tree Fire Heat Release Rate Prediction Competition

In the long-term fire safety research at UBC will contribute to improved understanding and design of

timber buildings, proportionate to their increased use and uptake in British Columbia and globally. This research will complement the existing excellent fire safety research groups in Canada and strengthen the national knowledge.

Signed: Felix Wiesner

University of Cantabria

Funding for Project NEXT in the TCNIC Call by the Government of Cantabria

In August, we received news of the funding for the NEXT project, "Intelligent System for Supporting the Prevention and Management of Industrial Emergencies in Cantabria" (Exp. 2023/TCN/004). With a grant of over €250,000, it has received co-financing from the European Regional Development Fund through the Cantabria 2021-2027 ERDF Operational Programme, as part of the grant line "Support for Research Projects with High Industrial Potential from Technological Excellence Agents for Industrial Competitiveness (TCNIC).

NEXT is an ambitious initiative that is based on the analysis of innovative technologies in the fields of artificial intelligence and machine learning for the development of a decision support system for safety in facing emergencies and incidents that can be applied in various industrial environments. By the end of the project, it is expected to reach a TRL 4, enabling a second phase of industrial transfer.

This intelligent system will enable the detection and traceability of emergencies in their early stages, providing effective action tactics to address them. This will be achieved through the integration of several modules, each designed to address specific aspects of industrial safety:

- Real-Time Detection and Analysis: This module will be responsible for identifying and analysing incidents in real time, providing an accurate view of the situation in the workplace.
- Prediction of Incident Propagation: Using detection data, this module will anticipate the spread of the incident, allowing for more effective planning to address it.
- Management Based on Predictions of Emergency Behaviour: This module will use advanced predictive models to assist in decision-making during an emergency, enhancing the safety of all the agents involved.

A standout feature of this system is its flexibility, as it can be used as a complete system or as independent modules, increasing its potential for adaptation to various industrial needs. Over the next 36 months, we will be working on this innovative initiative that aims to transform how we approach industrial emergencies in our region and possibly beyond.

The TRACES project has successfully finished



TRACES project has finished on August 31st. This three-year project focused on analysing self-protective behaviours in different threatening conditions. It involved two main data collection phases: online experiments (n=1807) and real experiments (n=60). Some of the findings will be presented at the IAFSS 2023. For more information about the study please refer to the recently published article in the Fire Safety Journal: [https://authors.elsevier.com/sd/article/S0379-7112\(23\)00222-9](https://authors.elsevier.com/sd/article/S0379-7112(23)00222-9)

TRACES project: "Understanding human behavior in case of terrorism attacks in mass gathering buildings" (PID2019-106025RB-100/AEI/10.13039/501100011033) was funded by the Spanish Ministry of Science and Innovation and the Spanish State Research Agency within the 2019 call for R+D+I Projects in the framework of the State Programs for Knowledge Generation and Scientific and Technological Strengthening for the R+D+I System and the Challenges of Society, under the State Plan for Scientific and Technical Research and Innovation 2017-2020 + "R+D+I Projects.



Thermal Characterization of Acrylonitrile Butadiene Styrene (ABS) Obtained via Different Manufacturing Processes

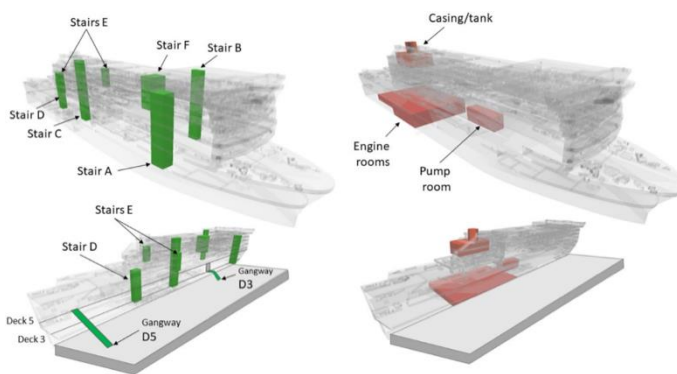
An article titled "Thermal Characterization of Acrylonitrile Butadiene Styrene (ABS) Obtained via Different Manufacturing Processes" has been published in the "Journal of Thermal Analysis and Calorimetry – JTAC." This work was previously presented at the CEEC-PCMS1 congress held at the University of Split, Croatia. It presents the results of various experimental tests conducted on neat ABS, highlighting variations in outcomes despite using similar materials and test conditions. Therefore, it is essential to provide an accurate description of the test boundary conditions to help researchers better understand how the test results were obtained. This work was conducted within the project 'Development of Halogen-Free Flame Retardant ABS - FLASH,' funded by FEDER/Ministerio de Ciencia, Innovación y Universidades—Agencia Estatal de Investigación/Proyecto RTC-2017-6414-5.

Experimental and analytical study of the influence of the incident heat flux in cables heat release

The journal of Thermal Analysis and Calorimetry has published the paper entitled "Experimental and analytical study of the influence of the incident heat flux in cables heat release". This work was previously presented at the CEEC-PCMS1 congress held at the University of Split, Croatia. The analyse a correlation between the incident heat flux in cables and the global HRR per unit area curve that they release during their combustion, testing up to five different cables and several heat fluxes. This work was conducted within the project "Metodologías avanzadas de análisis y simulación de escenarios de incendios en centrales nucleares" co-funded by the Consejo de Seguridad Nuclear.

Evacuation of Vessels in Dockyards: A Model Validation Study

An article titled "Evacuation of Vessels in Dockyards: A Model Validation Study" has been published in the "Fire Technology". The work addresses the challenges of the evacuation of workers during rehabilitation and transformation tasks of ships in shipyards. These jobs pose a safety challenge as they are carried out in small, confined spaces. The article provides new data about the behaviour of 150 workers in the evacuation process during a drill, validated with a simulation model (STEPS). The model faithfully represents the observed evacuation, suggesting that current simulation models, mainly used in buildings, could be applied to these new scenarios. This work has been carried out under the project "Improving safety during ship construction processes – Analysis of evacuation processes" funded by the SODERCAN 2021 call for aid to R&D projects in Information and Communications Technologies. Highlight the contribution and support of ASTANDER Astilleros de Santander, S.A.U. for the development of this research.



Signed: Mariano Lázaro

Case Western Reserve University

Lab members from the Computational Fire Dynamics Lab at CWRU. Left to right: Dr. Ankit Sharma, Dr. Byoungchul Kwon, Dr. Wohan Cui, Prof. Ya-Ting Liao, Boyu Wang, Ali Naqvi, Arland Zatania Lojo, Robin Neupane. Lab outing event at Top Golf. September 2022.

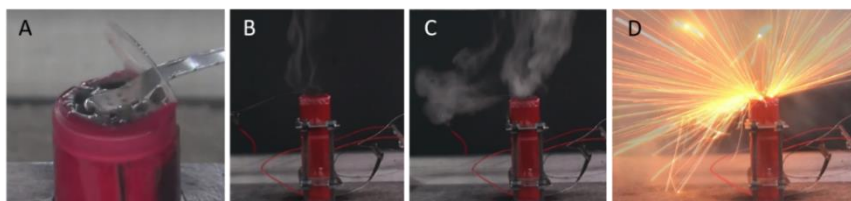


Battery fire experiments

Prof. Liao's group developed a test procedure to characterize thermal runaway and fires of Lithium-ion batteries (LIB) through in-situ measurements of various parameters in an environmental chamber. A series of thermal runaway and fire experiments were conducted in Liao's lab at CWRU in collaboration with Dr. Judy Jeevarajan's group in the Electrochemical Safety Research Institute (ESRI) at Underwriters Laboratories (UL).

The developed test method is published in Journal of Visualized Experiments with title "*In Situ Gas Analysis and Fire Characterization of Lithium-Ion Cells During Thermal Runaway Using an Environmental Chamber.*" A video describing the detailed test procedure is also published alongside the paper <https://app.jove.com/t/65051/in-situ-gas-analysis-fire-characterization-lithium-ion-cells-during>.

Picture on the right shows the key events during a typical thermal runaway process. (A) Opening of the venting port and boiling of the electrolyte. (B) Gradual release of the vent gases. (C) Intense release of the vent gas before thermal runaway. (D) Onset of the thermal runaway and fire.



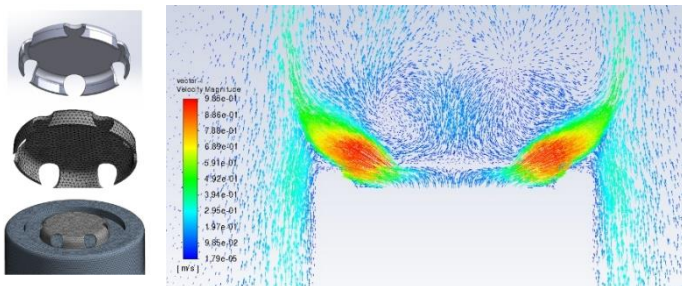
Current efforts are to extend the test procedure to different cell formats and to study fire propagation between multiple cells. These experiments are supported by Ph.D. student [Pushkal Kannan](#) and Postdoc Dr. [Ankit Sharma](#).

Prof. Liao's group started a new project in collaboration with Lubrizol. The objective is to investigate the effect of immersion cooling on thermal runaway of LIBs. It will involve quantifying and characterizing the gas species evolved during thermal runaway events of LIBs, in real-time, in immersed systems.

Another project focusing on understanding the fire hazards associated with LIB-Based Energy Storage System (ESS) is also ongoing in Liao's group in collaboration with Korea Conformity Laboratories (KCL) and Korea Testing Certification. Series of thermal runaway propagation tests were conducted by Dr. J. Y. Choi's group at KCL. Different configurations of LIB modules were evaluated with maximum number of cells at 90. Liao's lab is supporting the project through data examination and numerical modeling.

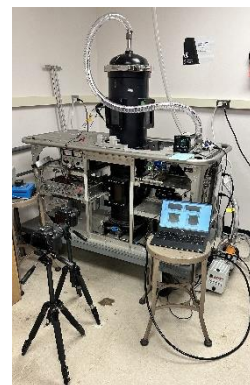
Battery fire modelling

Parallel to the battery experiments, Liao's group is developing numerical models for LIB fires. The detailed time-resolved data obtained in their experiments provided essential parameters for the model development. The thermal model of the solid battery cell is coupled to the gas phase model through interfacial boundary conditions, with one being the release of the vent gas from the battery cell to the gas phase. Picture here shows preliminary results of the three-dimensional fluid dynamics simulation during the cell venting process of an 18650-battery cell (geometry and mesh of the battery shown on the left and velocity vector field shown on the right). The simulation was able to capture the fluid dynamic aspects of the vent gas deflected by the cap. The next steps will be implementing test-based dynamic vent gas fuel release (both for composition and vent rate), and the combustion of the vent gas using the three-dimensional model. This project is supported by Ph.D. candidate [Boyu Wang](#).



Micro- and partial gravity fire research

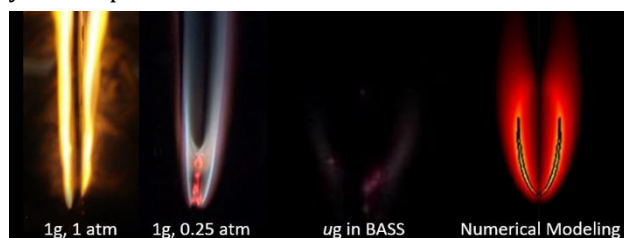
Liao's group is exploring the role of gravity-induced buoyant flow on fire dynamics. Experiments are performed in a combustion chamber (shown in the right picture) in different reduced pressure and oxygen concentration environments to assess fire safety in future space missions. This work is sponsored by NASA Glenn Research Center. Ph.D. candidate [Robin Neupane](#) is supporting the experimental effort of this project. He will present the preliminary results in the upcoming ASGSR conference in Washington DC in November.



This project also provided opportunities for high school students in the Greater Cleveland Area to participate in research. In Summer 2022, three high school students (Wyatt Black from Berea-Midpark High School, Tienna Zeng and Viresh Mittal both from Solon High School) worked in Liao's lab at CWRU and conducted a literature review on fire dynamics in micro and partial gravity. The three high school students presented their findings in 2022 American Astronautical Society John Glenn Memorial Symposium in Cleveland Ohio and won the **best poster award in the Engineering- High School Category**.

To further explore the role of buoyancy flow in flame spread process, a Computational Fluid Dynamic (CFD) model is developed. The model has been successfully validated against literature data. The simulations extend the results to a wider range of oxygen concentration and pressure environments. This numerical effort is led by Dr. [Ankit Sharma](#). Initial results will be presented in the 2023 ASGSR annual meeting and in a journal soon.

In addition to ground experiments and numerical modeling, Liao's lab uses data obtained in *micro* and *partial* gravity platforms to obtain a more complete understanding of buoyant flows on fire dynamics. In April 2023, Prof. Liao participated in NASA and ESA's burning experiments in DIAMONDS combustion rig (PIs: [Prof. Guillaume Legros](#), [Prof. Augustin Guibaud](#), [Dr. Jean-Marie Citerne](#), [Dr. Paul Ferkul](#), [Dr. Claire Fortenberry](#), and [Dr. Michael Johnston](#)) aboard the ESA's parabolic flight campaign. In this project, they observed how materials burned in Lunar and Martian gravity. Data obtained is tremendously important for model and theory development and validation. In addition, Prof. Liao (PI) and [Dr. Sharma](#) (co-PI) received a new grant from [NASA PSI](#) in Summer 2023. This new grant will allow them to leverage the rich dataset in NASA's PSI system of previous microgravity fire experiments. The PSI data will be complemented by existing and new ground data and numerical modeling results to lead to new science. Picture on the right shows the comparison of experimental and numerical flame in different conditions of pressure and gravity.



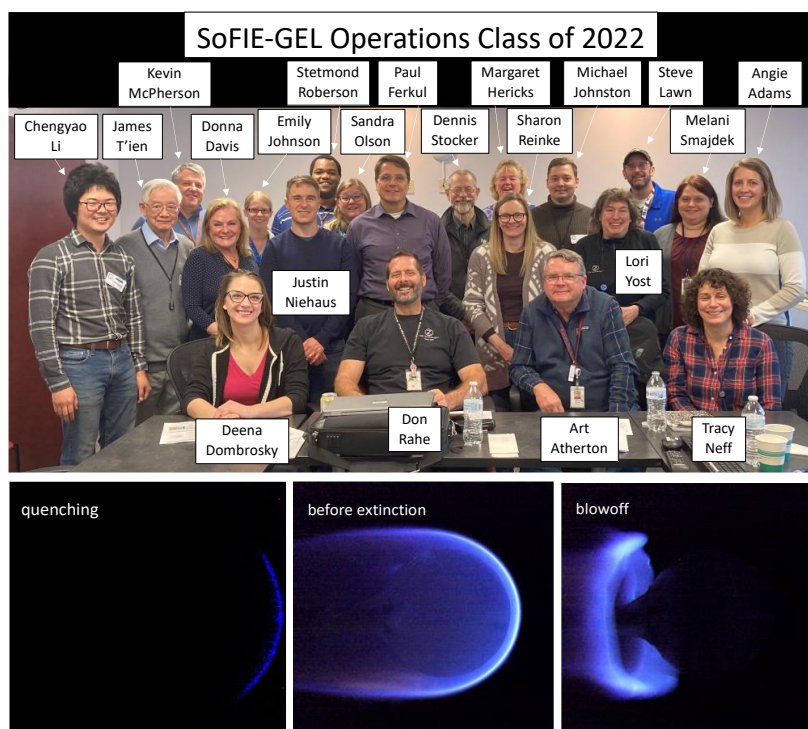
ISS Fire Experiments SoFIE-GEL

Another current research on microgravity fires at CWRU is the **SoFIE-GEL** (Growth and Extinction Limit) project where [Prof. James S. T'ien](#) and [Dr. Chengyao Li](#) are serving as the PI and the co-I. GEL is one of the five experiments of the [NASA's SoFIE](#) (Solid Fuel Ignition and Extinction) project, led by Dr. Paul Ferkul from NASA/USRA. **GEL is the first experiment of the SoFIE** and took place this summer aboard the International Space Station.

The common objectives are to understand the effect of microgravity and low-speed pure forced flow on the burning and flammability of solid materials in various atmospheres. This will help NASA to select materials and designs for spacesuits, cabins, and habitats. All the experiments are conducted inside the CIR (Combustion Integrated Rig) chamber aboard the ISS, equipped with the SoFIE insert that allows for varying flow speed, pressure, and oxygen percentage.

The experiments are remotely controlled by ground crews (Figure). Astronauts are needed to change test samples, gas cylinders, and, if necessary, to perform repairs. The science and operation team of SoFIE-GEL is large as shown in this picture. Shown here are PI, James T'ien, Co-Is, Paul Ferkul, Sandra Olson, Michael Johnston, and Chengyao Li. The rest are supporting engineering team members from ZIN Technology.

The five experiments are conducted sequentially, with **GEL (Growth and Extinction Limits)** from CWRU being the first. It commenced in February 2023 and is currently approximately halfway through in terms of completed test points. The samples in GEL are 4-cm diameter PMMA spheres facing in a low-speed flow. Five embedded thermocouples are used to quantify the effect of internal heating. In each test, ignition delay time, flame growth rate, flame profile and extinction limits are recorded. Both the low-speed quenching and the high-speed blowoff limits are determined. The effect of internal heating, represented by the sub-surface temperature gradient, on extinction limits has been experimental quantified. The different flame appearances of the two near-limit flames are illustrated in the picture here. Prior to extinction, flame pulsation or oscillation were observed.



Wildland fires

Dr. Liao received [a new grant from NSF](#) as a co-I. The PIs of this project are [Prof. Samuel Grauer](#) at Pennsylvania State University and [Prof. Bryan Schmidt](#) at CWRU. The project will develop and validate a physics-inspired and physics-informed background-oriented schlieren tomography (BOST) algorithms that resolves 4D fire events. Specifically, they will implement multiresolution wavelet-based unified BOST (UBOST) with a physics-inspired closure. Validation will be performed using Direct Numerical Simulation phantoms that correspond to fires experiments performed in the lab. The fire experiments will consider simple and complex solid fuel arrangements to produce relevant fuel topology/entrainment interactions. UBOST and CFD results will be cross validated. Finally, a physics-informed algorithm that includes a combustion model will be developed to improve the resolution of reconstructions and infer additional fields. Ph.D. student [Ali Naqvi](#) is supporting this project under direct guidance from Dr. Liao and Dr. Schmidt.

[Dr. Byoungchul Kwon](#) from Liao's lab published a paper titled "[Effects of Spacing on Flaming and Smoldering Firebrands in Wildland-Urban Interface Fires](#)", in Journal of Fire Sciences. This paper investigates the effects of firebrand distribution and ambient wind on the ignition propensity of structural materials exposed to multiple firebrands in wildland-urban interface (WUI) fires. Flaming and smoldering processes of a group of firebrands were studied through a series of burning experiments using a 3×3 square array of birch wood cube samples. Ambient wind is imposed parallel to the plywood surface to investigate its effect on the ignition and the subsequent flame spread over the fuel. Results from this study demonstrated significant influence of spacing and wind speed on the ignition and the burning behavior of the substrate materials.

[Dr. Wohan Cui](#) and [Dr. Ankit Sharma](#) published a paper titled "[Upward flame spread over discrete thin solids separated by heat-absorbing inert materials](#)" in Journal of Fire Sciences. In this paper, experiments were conducted on upward flame spread over a vertical array of discrete thin solid fuels separated by air and inert gaps. A simplified theoretical analysis is performed to predict the flame front spread rates. Good agreement was obtained between the theoretical predictions and experimental data.

Climate Change and fires

[Dr. Ankit Sharma](#), post doc in Liao's group published a white paper on **Grand Challenges in Climate Change and Fire** as part of research grant received in 2022 from **SFPE Foundation**. This white paper outlines a plan for research and action for the next ten years to address the significant challenges brought by climate change within the realm of fires safety. Dr. Sharma co led the work with support from a diverse team extending across 7+ countries and involved 25+ organizations. [White papers](#) are now online for public comment period.

Recent Graduates

Three lab members recently graduated from Liao's group. Arland Zatania Lojo (a BS/MS student) successfully defended his MS thesis "Effects of Coriolis force on liquid fuel wick flames in artificial partial gravity in a centrifuge" in December 2022 and is currently working at NASA Glenn Research Center.

Dr. Byoungchul Kwon defended his dissertation "Ignition and Burning Behavior of Modern Fire Hazards: Firebrand Induced Ignition and Thermal Runaway of Lithium-Ion Batteries" in February 2023 and joined Dr. Jeevarajan's group at UL ESRI in Houston Texas after his graduation.

Dr. Wohan Cui defended his dissertation "Burning Behaviors of Thin Solids in Normal and Microgravity – Effects of Sample Configuration and Environmental Conditions" in March 2023 and joined Whirlpool in St. Joseph Michigan.

Left: Dr. Kwon and Dr. Cui in front of UL Fire and Combustion Lab. Center: Prof. Liao with Dr. Cui and their committee members. Right: Prof. Liao with Arland and some of their committee members.



Honors and Awards

Prof. Ya-Ting Liao was selected as one of the top three finalists for the [2023 NPA Gallagher Mentor Award](#) by the National Postdoctoral Association. The award recognizes a faculty member or advisor who engages in exceptional mentoring of postdoctoral scholars.

Prof. Fumiaki Takahashi was awarded the prestigious status [Fellow of Combustion Institute in 2023](#) for his outstanding contributions to the fundamental research of flame structure, stabilization, and fire suppression.

Dr. Ankit Sharma, post doc in Liao's lab received the [5 Under 35 SFPE Award](#) in 2023. This award represents the world's top five rising leaders who work at any level in the industry, academics, and has had a great impact in the field or within the society.



Recent Events and Invited Talks

Prof. Ya-Ting Liao is hosting the **2024 Technical Meeting of the Central States Section of the Combustion Institute**. The meeting, co-hosted by CWRU and NASA GRC, will occur on May 12-14, 2024, at CWRU campus in Cleveland Ohio. Researchers, Graduate, and Undergraduate students are encouraged to submit abstracts and to participate in the conference. More information will be announced soon.

Prof. Ya-Ting Liao attended 14th Asian-Pacific Conference on Combustion in Kaohsiung, Taiwan in May 2023. During her trip, she also delivered an invited talk in the 33rd National Conference on Combustion and Energy of the Combustion Institute of R.O.C. Prof. Liao met three former students from Prof. James T'ien's lab: (from left to right in the right figure) Prof. Hsin-Yi Shih (now at Chang-Gung University), Prof. Chiun-Hsun (Charlie) Chen (now at Feng-Chia University), and Prof. Sheng-Yan (Sam) Hsu (now at National Sun Yat-Sen University).



Lab members Robin and Ankit received partial funding to attend the Burgers Program and Combustion Institute Summer School on Fire Safety Science – Wildland/WUI Fire Behavior in June 2023 at University of Maryland. We appreciate the support and opportunities provided by the University of Maryland and the US Sections of the Combustion Institute.

Ankit delivered an invited talk at National Institute of Standards and Technology (NIST), MD USA on "Challenges of Fire Safety in Modern Times- From earth to Space" in May 2023.

Signed: Ankit Sharma

Université de Poitiers

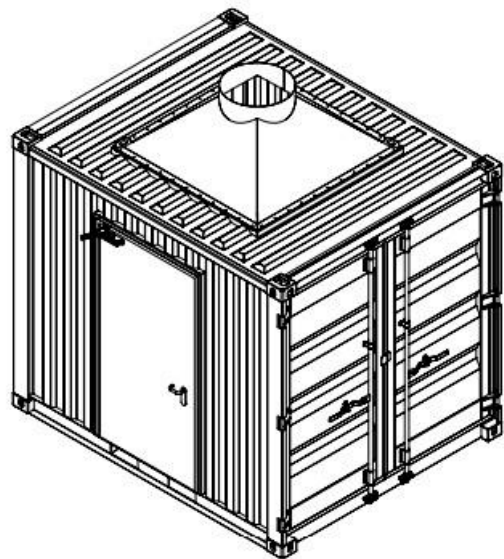
Evolution of the "HESTIA Fire Safety Platform" in order to study the fire behavior of the batteries

Pprime Institute and universit  de Poitiers benefit of a financial support from France Government and Region Nouvelle Aquitaine in order to complete the equipment's of the "Hestia Fire Safety Platform" to can study and investigate the fire behaviour of the batteries.

With this project "PLATABAT", a specific hall will be dedicated to this application, with:

- A new TGA-DSC apparatus
- A new cone calorimeter
- A safety enclosure equipped with several thermocouples and flux meters
- An IRTF spectrometer

The equipment's are being delivered and installed actually. The first tests should start in September 2023.



Project "Li-ION Batteries: prevention and protection"

The consortium managed by Pprime Institute (universit  de Poitiers) won the call of project "Related risks and solutions battery-powered rechargeable" from Fondation MAIF, with the project "LI-Ion batteries: prevention and protection"

The consortium is composed of Pprime, Efectis, Calyxis, Duorisk and SDIS49 (Firemen).

The objective of the project is to:

- Conduct a detail review of the accident involving some LI-Ion batteries in order to identify the main technologies involved into the fires, the technologies of the batteries involved, the main scenarios and the consequences.
- Realize a detail experimental characterization of the fire behavior of several kinds of rechargeable batteries met in buildings: phone, compute, tools, cycles, etc. A specific attention will be kept to the gaseous emissions as well as the risks of propagation of the fires involving batteries.
- From those experimental results, we will develop numerical tools in order to better describe the fires of batteries and their propagation, for different scenarios and building configurations.
- Determine recommendations on appropriate conducts and best practices in order to prevent the fires of batteries, to protect themselves and to fight against fires.

The project will start in September 2023 for 24 months.

"Fire RESistaNce of External Thermal Insulation Composite Systems - FRENETICS" Project. A large scale campaigns

The French national program "Fire RESistaNce of External Thermal Insulation Composite Systems - FRENETICS" involved Institut Pprime, Efectis, UMET (Lille) and CORIA (Rouen).

The work focused on two main systems, one ETICS and one HPL. Whereas UMET has characterized the fire behavior of those materials at small scale (TGA, cone calorimeter, small radiant panel), Pprime has worked at medium scale (0,5*0,5m² and 1*1m²).

Now a campaign will be conducted at large scale into Efectis platform located in "les Avenieres". Three LEPiR-2 tests will be done and one BS8414. During those large-scale tests, a specific and detailed scientific instrumentation will be used: thermocouples, flux meters, IR cameras, etc.

The objectives are to validate the results obtained at smaller scale with those new real scale data.

Signed: Thomas Rogaume

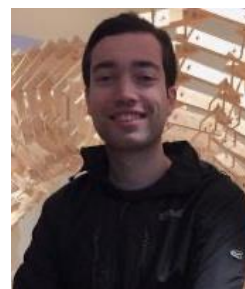
News from the University of Edinburgh

For all the latest news from the Centre for Fire Safety Engineering at the University of Edinburgh follow us on Twitter [@edinburghfire](https://twitter.com/edinburghfire) or on facebook.com/EdinburghFire

One in, one out...

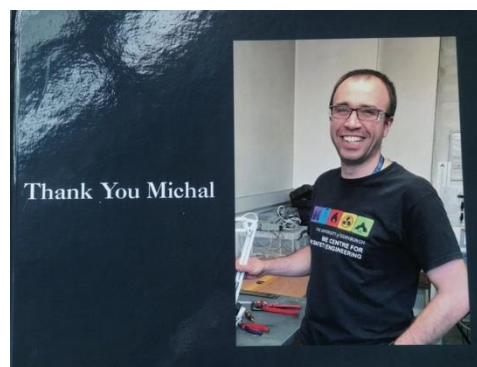
Dr Zakary Campbell-Lochrie joins the Edinburgh Fire Research Centre

This September, Edinburgh alumni Dr Zakary Campbell-Lochrie has returned to the group as our new Lecturer in Fire Science. Zak's research considers the fundamental phenomena controlling wildland flame spread, with a focus on the effect of vegetation structure on fire behaviour. He also has a particular interest in instrumentation development, and the incorporation of practical engineering activities within the engineering curriculum building on his work in his previous role at The Open University.



Michal Krajcovic leaves the Edinburgh Fire Research Centre

Since about as long as we can remember, the functioning of our group has depended quite heavily upon one key individual, namely Michal Krajcovic, in his role as Experimental Officer in Fire Science. All good things come to an end and, having also graduated from our MSc in Structural and Fire Safety Engineering a few years ago, Michal has now moved on to a fire consultant role. The many reminiscences of his contributions to the life of the group over many years spanned the technical "small to large tweaks of hard or software in the lab", "finding impossible fittings in the eleventh hour" to the "more general and serious issues" and his much valued contributions to the cake club, concluding simply "You are the GOAT".



Michal's post has not remained vacant for long and we were delighted to welcome Mark Partington to the role; Mark is already well known to us having worked in the Technical Services team in the School for a number of years.

Completed PhD projects

The last few years have seen a good number of fiery PhD projects being finalised and we congratulate the following on their graduation and new roles:

2020

- Martina Manes "Towards resilience evaluation of buildings when exposed to fire based on English and USA fire statistics" <https://era.ed.ac.uk/handle/1842/37683>
- Nikolai Gerasimov "Behaviour of intumescent coatings under non-standard heating conditions" <https://era.ed.ac.uk/handle/1842/37507>

2021

- Zak Campbell-Lochrie "Physical phenomena controlling quiescent flame spread in porous wildland fuel beds" <https://era.ed.ac.uk/handle/1842/38699>
- Simon Santamaria "Ignition of solids exposed to transient irradiation" <https://era.ed.ac.uk/handle/1842/38444>
- Danijela Stankovic "Performance of pin-loaded carbon fibre reinforced polymer straps at elevated temperatures" <https://era.ed.ac.uk/handle/1842/39191>

2022

- Ulises Rojas-Alva "Challenges to predict and assess flammability of materials intended for use in microgravity environments: a case study of polydimethylsiloxane (PDMS) membrane sheets" <https://era.ed.ac.uk/handle/1842/39064>
- Timothy Aspinall "Quantifying the thermomechanical behaviour of carbon fibre reinforced polymer materials exposed to fire conditions" <https://era.ed.ac.uk/handle/1842/39439>
- Russell Wallace "Behaviour of steel reinforcement in composite slabs at elevated temperatures" <https://era.ed.ac.uk/handle/1842/39486>
- Carlos Walker-Ravena "Understanding the heat transfer, pyrolysis and ignition of wildland fuels" <https://era.ed.ac.uk/handle/1842/39641>
- Georgios Kanellopoulos "External fire spread from timber lined compartments" <https://era.ed.ac.uk/handle/1842/39179>
- Mohamed Beshir "Experimental and numerical study for the principal fire dynamics within thermally-thin bounded compartments (case study: informal settlements in Cape Town, South Africa)" <https://era.ed.ac.uk/handle/1842/39208>
- Jens Steemann Kristensen "Fire risk associated with photovoltaic installations on flat roof constructions: experimental analysis of fire spread in semi-enclosures" <https://era.ed.ac.uk/handle/1842/40402>

2023

- Vasileios Koutsomarkos "Developing a fire robustness index for the built environment" <https://era.ed.ac.uk/handle/1842/39803>

- Christopher Bateman “Parametric investigation of the fire development in parallel plate systems”
<https://era.ed.ac.uk/handle/1842/40571>

Also Sam Stevens successfully defended his thesis on “Computational modelling of fire spread through informal settlements” in June of this year.

Interestingly, when checking our records, it seems that this latest batch will take us to 97 Edinburgh fire PhD graduates, since the first in 1980, and with an MPhil and MSr along the way, to 99 Post-graduate research graduates, so watch this space...

Structural and Fire Safety Engineering (SAFE) MSc

We recently convened the 15th annual poster day for the SAFE MSc, with research conducted into wide-ranging topics:

Photo	Forename	Surname	Topic	Supervisor(s)
	Daniel	Rojas Martins	Sprinkler activation time and performance at storage facilities for	Welch
	Jagannatan	Sowrirajan	Bifurcation flow in tunnel fires	Carvel
	Johnny	Zhong	Determination of flame size with fire interaction	Law
	Shicheng	Lin	Smouldering behaviour of timber parallel plates in the compartment	Law
	Chang	Ge	Evaluate viability of reused steel components	Lu
	Yuening	Wang	Structural behavior of sheathed steel panel for modular construction	Huang/Ringas
	Junwei	Lu	Fire spread modelling in informal settlements	Rush
	Xueqi	Liu	Using acoustic emission, elastic wave tomography and AE tomography in	Chai



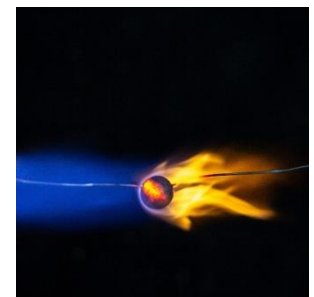
We're grateful to our programme sponsor, Socotec, who fund the prize awards for best dissertation and best poster, thanks to support from Thomas Carpentier, and would also like to thank Prof Kathryn Cashell, now of UCL, who had served a full 5 years as our external examiner.

Looking at landmarks, once the marks have been finalised and students graduated this will bring the total number of SAFE MSc graduates to well over 100, of which 15 have graduated with Distinction, 18 with Merit, and of which at least 10% have gone on to pursue PhD study, and beyond. While a small number of students are still finalising their dissertations this was the last entering cohort on the SAFE MSc, and the Programme Director (Dr Stephen Welch) is looking forward to a break, but this brings us to:

Fire Engineering Science MSc

We are excited to have now launched a refocused MSc in Fire Engineering Science. According to the [programme description](#): this will provide students with a deep understanding of the fundamental physical processes of fire behaviour, and their application in engineering.

New technologies and climate change are increasingly introducing new and complex fire hazards into environments that were previously considered low hazard. Our graduates will gain the knowledge of fire science and its engineering application which will allow them to help reduce and control these hazards.



Students will study how fires burn (fire dynamics), how regulators controls fire risks, and how our environment can be changed to mitigate fire risks. Students will learn about how to measure and study fire phenomena through the fire laboratory class. Finally, as part of the dissertation, students will have the opportunity to contribute to the sum of human knowledge by applying their new expertise and understanding to a relevant dissertation topic.

The new MSc is introduced by the Programme Director, Dr Angus Law, in this short video: <https://youtu.be/MQ9WFF471>

Drysdale Scholarships ([link](#))

We also have a number of scholarships available to eligible candidates. The Drysdale Scholarships cover tuition fees for successful candidates. Applications are open to individuals from any background, provided they can meet the criteria. Applications for students commencing their studies in September 2024 will be opening shortly and

will have a deadline of 31st March 2024. It is important to highlight that applicants must also apply directly to the University of Edinburgh's MSc in Fire Engineering Science by the same deadline.

- Awards: The Scholarship covers successful applicants' tuition fees. On commencement of study, scholarship awardees will also receive a copy of Drysdale's Introduction to Fire Dynamics.
- Eligibility: To be considered for this scholarship, applicants must hold an offer to study on the Fire Engineering Science MSc at the University of Edinburgh OR have an offer presently under review within the University applications system.
- Criteria: Fire Engineering Science is a multidisciplinary endeavour. While a science or engineering background is likely to be a benefit within this programme, is not a required prerequisite. We will assess applications using the following criteria: (1) Academic merit – evidence of high academic achievement. (2) Interest – fire engineering science is multidisciplinary, so the applicant must explain how their previous academic or professional experiences have influenced their choice to study this subject. (3) Background – we are keen to bring talent from a range of backgrounds into the field of fire engineering science so applications from underrepresented groups are encouraged.

IMFSE

We are excited for a new cohort of IMFSE students to arrive and to continue involvement in that programme with Ghent, Lund and UPC Barcelona. The Edinburgh courses have been better optimised for new entrants in their first semester on the programme including an enhanced fire lab course which incorporates an introduction to experimental techniques and relevant theory. Current courses are:

- Fire Science and Fire Dynamics 10 credits
- Structural Design for Fire 10 credits
- Fire Safety Engineering 10 credits
- Fire Science Laboratory 20 credits
- Research Methods for Engineers 10 credits

We also look forward to a number of students coming to Edinburgh for their masters thesis in semester 4.

Research projects

Ongoing PhD research started over the last couple of years includes:

- Mahadev Rokade: Concrete material properties in cooling (supervised by David Rush)
- Jonny Reep: Measurement of pyrolysis products. Funded by Ministry of Housing Communities and Local Government with OFR Consultants and others (supervised by Rory Hadden)
- Sergio Vargas: Flow effects in wildfire spread. Funded by Strategic Environmental Research and Development Programme with WPI and others (supervised by Rory Hadden)
- Laura Schmidt: Char oxidation effects on engineered timber (supervised by Rory Hadden)
- Antonella Colic: Response of Mass Timber Elements Subjected to Full Burnout Fires (supervised by Luke Bisby)
- Hussein Cadosch: Behavior of expanding concrete mixes in fire (supervised by Luke Bisby)
- Alex Boloux: Performance of timber connections at elevated temperature (supervised by Luke Bisby)
- James Greer: Behaviour of fires on combustible ceilings with an emphasis on timber (supervised by Angus Law)
- Ali Ahmed Ali Awadallah: Fire performance of CLT (supervised by Angus Law)
- Chang Liu: Computational modelling of travelling fire – a follow-on from the EU TRAFIR project, with computational resource provided by the UKCTRF project (2014-2023) (The authors are grateful to EPSRC (grant number: EP/R029369/1) and ARCHER for financial and computational support as a part of their funding to the UK Consortium on Turbulent Reacting Flows (www.ukctrf.com)) and more recently on the Cirrus machine c/o the Scottish Academic Access (his work used the Cirrus UK National Tier-2 HPC Service at EPCC (<http://www.cirrus.ac.uk>) funded by the University of Edinburgh and EPSRC (EP/P020267/1)) (supervised by Stephen Welch and Dr Xu Dai (Birmingham City University))

Currently we are also welcoming some new PhD students, including Ting-Hsuan Liao from Taiwan. He will be studying emergency ventilation strategies for egress in metro system fires, under the supervision of Dr Carvel.

Earlier this year we also hosted a visiting PhD student, Calisa Lemmert, from Universidade Federal do Rio Grande do Sul, Brazil, who conducted a series of experiments on ¼ scale thermally-thin compartments to understand the influence of restricted air entrainment on the time to flashover and external flaming. In related work Dr David Rush is advising Kindling on their experimental work looking at refugee camp fire development and spread, and has worked with colleagues in Jordan to assess the fire risk of two of their refugee camps.

Signed: Stephen Welch

European University of Cyprus - CERIDES

CERIDES is hosting two early-stage fire researchers under the framework of **PyroLife**, a research and training program funded by the Marie Skłodowska-Curie Action, Horizon-2020. The project aims to solve the increasingly complex wildfire challenge in Europe and globally by fostering knowledge exchange across disciplines, sectors, and geographies, while pushing for social diversity as one part of the solution. PyroLife researchers in Cyprus explore the theory and practice of governing wildfire, and a better understanding to wildfire interagency exchange. More information about the project can be found at <https://pyrolife.lessonsonfire.eu>.

Collaboration and knowledge exchange to tackle wildfire risk also form the core of the **SEMEDFIRE** project. This is a Widening Project funded by Horizon Europe, aiming to empower CERIDES to become a regional fire research hub in SE Europe. Here, the CERIDES team benefits from the input of five leading European wildfire institutions – the Pau Costa Foundation (Catalonia), Wageningen University (Netherlands), Imperial Hazelab (UK), and the General Directorate of Civil Protection of the French Republic and Crisis Management of Nimes Metropole (France). Expertise in this project aims to advance fire modelling and evacuation, the concept of integrated fire management, opportunities for community engagement, and novel insights on wildfire and civil protection governance in Cyprus. More information about the project can be found at <https://semedfire.eu/>

Researchers at CERIDES further contribute to the **fireUrisk** project, an Horizon 2020 EU-funded research consortium on fundamental wildfire sciences. Key targets of this work are to identify community vulnerability, to identify measures for reducing the risk particularly by integrating social components, and to increase adaptivity to future wildfire regimes driven by rapidly changing climatic and socioeconomic conditions. More information about the project can be found at <https://fireurisk.eu>

Signed: George Boustras, Christos Dimopoulos, Cleo Varianou Mikellidou, Klelia Petrou, Iasonas Senekis, Judith Kirschner, Pooja Pandey, Matthieu Jost, Pierantonios Papazoglou.



Fire Protection Research Foundation

Fire Protection Research Foundation (FPRF) receives funding for three new projects -

The Fire Protection Research Foundation, the research affiliate of the National Fire Protection Association® (NFPA®), has received funding for three new projects: (1) One-year project to investigate the *Lithium-Ion Battery Transit Bus Fire Prevention and Risk Management* from the National Academy of Sciences' Transit Cooperative Research Program (TCRP.), (2) Two-year U.S. DHS FEMA Assistance to Firefighters Grant funding for studying the *Role of Training in Volunteer Fire Service Recruitment & Retention*, (3) Two-year U.S. DHS FEMA Assistance to Firefighters Grant funding for continuing the work on applications of fire fighter immersive learning training environments, *TRAIN - Training Responders' Awareness using Immersive Next-Gen Technology*.



**RESEARCH
FOUNDATION**
RESEARCH FOR THE NFPA MISSION

2023 Suppression, Detection and Signaling Research and Applications Conference (SUPDET® 2023)– SUPDET® is an annual symposium hosted by the Fire Protection Research Foundation that brings together leading experts in the field of fire protection for the purpose of sharing recent R & D on techniques used for fire suppression, detection, and signaling. The 2023 conference was held on September 12-14, 2023, in Chicago-Northbrook, Northbrook, IL (USA). The 2023 conference program is available [here](#).

Notice of recent FPRF research reports

- **Firefighter Immersive Learning Environment (FILE):** The overall goal of this two-year project was to identify, assess, and summarize the available and emerging technological tools, techniques, and innovations, to support the application of immersive learning environments in fire service training and address its impact on firefighter skills, health, and safety during training. Multiple reports were published from this effort: (1) literature review that summarize the current landscape of immersive learning in fire service training and education, (2) summary of focus group discussions with key stakeholders to gain insight about the distinct training delivery systems of fire training academies, (3) proceedings from stakeholder summit that evaluated the overall state of immersive learning technology in fire service training and education, and (4) FILE roadmap document that summarize key takeaways from all of the above. For further information, visit: www.nfpa.org/ffimmersivellearning.

- **Fire Safety and Photovoltaic Panels on Building Roofs Workshop** – The “Fire Safety and Photovoltaic Panels on Building Roofs Workshop” event was held on March 8, 2023, at the Danish Embassy in Brussels, Belgium. The primary objective of this workshop was to review the latest information, experiences, and research related to fire safety of photovoltaic panel installations on commercial building roofs to identify best practices for safety and installation, considerations for new policy recommendations and regulations, as well as knowledge gaps. Download the report [here](#).
- **Laser Ablation Process: Applications and Hazards Review** – Laser ablation process has emerged as an easy, effective, and environmentally friendly process to remove and modify materials without causing damage to the surrounding material, and has applications in various aspects in engineering, from aerospace to medical. This literature review research summarizes laser ablation process applications, potential hazards associated with the process and its byproducts and reviewed corresponding safety requirements from applicable existing codes and standards.
- **Smoke Detector Spacing in High Ceiling Spaces** – NFPA® 72, National Fire Alarm and Signaling Code, does not address spacing consideration for smoke detection based on ceiling heights. The outcomes of this study provide guidance for the installation of smoke detectors on ceilings over 10 ft (0.3 m). The outcomes propose prescriptive guidance for ceiling heights up to 40 ft (12 m), with equations to determine appropriate spacing based on the ceiling height for spot type and beam type detectors. Performance-based designs are encouraged for ceiling heights exceeding 40 ft (12 m).
- **Impact of Elevated Walkways in Storage on Sprinkler Protection – Phase II** - The goal of this research was to provide technical substantiation and guidance for sprinkler protection in the presence of elevated walkways in storage occupancies. This research was necessary as sprinkler performance may be affected due to the presence of a mezzanine, walkway grating interfering with the spray, delayed activation of the sprinklers because of the grate’s influence on the plume, or the impact of pre-wetting of adjacent racks. Ultimately the objective of this effort was to provide guidance to the NFPA 13 technical committee on walkways/sprinkler interface criteria that is well founded in sprinkler performance.
- **Evaluation of Electrical Conductors in Thermal Insulation** - The goal of this project was to assess current literature and laboratory results on the topic of small branch circuit wiring installed in thermal insulation envelopes and propose a research plan to address gaps in the industry’s understanding of the conductor operating temperature impact in such installations. Review the report [here](#).

For more information, visit: www.nfpa.org/foundation

Signed: Sreenivasan Ranganathan

FM Global

FM Global Open Source CFD Fire Modeling Workshop

We are pleased to report that the FM Global Open Source CFD Fire Modeling Workshop returned in-person in April 2023 following a three-year hiatus due to the Covid-19 pandemic. There were a record number of presentations and attendees ensuring the successful return of this annual event.

The next workshop will be held April 17-18, 2024 at the Four Points by Sheraton in Norwood MA. Registrations and submissions will be open later this year.



Group photo from 2023 FM Global Open Source CFD Fire Modeling Workshop

International Standards Organization Meeting

FM Global hosted the International Standards Organization (ISO) technical committee (TC) 92 sub-committee (SC) 1 meeting at Norwood, Massachusetts from May 3 to 5, 2023. The ISO TC92 SC1 develops international standards and other documents related to Fire Initiation and Growth topics – these cover bench-, intermediate-, and large-scale fire test methods of materials, along with their application in fire safety engineering. Additionally, topics on instrumentation and analysis techniques used in fire tests are covered under the scope of ISO TC92 SC1. Twenty delegates from ten countries attend the meetings hosted at Norwood. The delegates took a guided half-day tour to the FM Global Research Campus fire laboratories located at Rhode Island and witnessed live façade fire tests. The delegates also took a guided tour to the FM Global Learning Center (SimZone), which is a warehouse-sized state-of-the-art training facility located at FM Global's Norwood Campus.



Group photo of ISO TC92 SC1 meeting members taken on-site at FM Global Small Burn Laboratory.

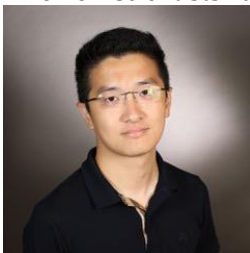
Smoke Vent Public Report

FM Global has released a report on the use of gravity smoke vents in storage occupancies to the public. The full report can be downloaded from this URL: <https://www.fmglobal.com/research-and-resources/research-and-testing/research-technical-reports>

The report focuses on the benefits/drawbacks of using gravity smoke vents in storage occupancies from a property loss prevention perspective. The headline result: that gravity smoke vents alone provide no property loss prevention benefit, but that they do not impede an otherwise adequate sprinkler system if they are appropriately designed, provides a significant update to FM Global Data Sheets and helps to reconcile the competing historical views on this topic. The full story is available in the report including all technical details. This work was only possible due to the combined efforts of large-scale testing and numerical simulations.

New Staff

Two new scientists have joined the fire modeling team in 2022: Dr. Xiaoyi Lu and Dr. Danyal Mohaddes.



Xiaoyi Lu comes to FM Global from a post-doc at Texas A&M University where he performed research on detonative combustion. He obtained his PhD in Theoretical and Applied Mechanics from the University of Illinois at Urbana-Champaign. Xiaoyi is currently applying his expertise to several topics including façade fire, radiative heat transfer, adaptive mesh refinement, and GPU acceleration.

Danyal Mohaddes has joined FM Global after obtaining his PhD in Mechanical Engineering from Stanford University on the topic of hot surface ignition and combustion of fuel sprays. He is currently investigating pyrolysis and flame spread dynamics for charring and non-charring fuels, battery fire modeling, and novel applications of machine learning and generative artificial intelligence concepts to fire modeling.



We warmly welcome Xiaoyi and Danyal to FM Global!

Post-docs and Internships

Dr. Juan Cuevas will join the flammability team as the latest member of the FM Global post-doc program. Juan will be investigating several topics including lithium-ion battery safety, and material flammability. He joins us from a post-doc at Worcester Polytechnic Institute studying wildland fires, combustible façades, and flame extinction.

Prior to WPI, Juan obtained his Ph.D. from the University of Queensland on the topic of timber flame extinction. We look forward to welcoming him to the team and working together over the coming years.

We are also looking for another postdoc researcher in the area of explosion protection. Please see job profile in this link: <https://jobs.fmglobalcareers.com/job/norwood/post-doctoral-researcher-for-explosion-protection-research/474/50014437120>

Our 2023 summer internship program recently concluded, marking another successful interaction with up-and-coming research scientists. Three interns: Jiale Xing, Michael Chak, and Md Abdul Aziz, made excellent progress in topics on lithium-ion battery and material decomposition. We thank them for their contributions and look forward to seeing what they do next!

Visiting Scientists

We recently hosted four visiting scientists: Drs. Rob Barlow (retired scientist from Sandia National Lab), Fatiha Nmira (EDF-France), Jean-Louis Consalvi (University of Aix-Marseille), and Xinyan Huang (Hong Kong Polytechnic University). Rob brings his vast knowledge from a career in characterizing reacting flows to bear on a wide range of fire topics, offering many insights to our research programs. Fatiha and Jean-Louis are active collaborators on topics relating to modeling soot and radiation, a remarkably complicated topic central to understanding fires. Xinyan made presentations and in-depth technical exchanges on the topic of AI and digital twin in fire protection engineering, molten thermoplastic fire, as well as battery safety. We gained a great deal from their visits and look forward to seeing them again soon.



Rob Barlow (left), Dong Zeng (center), and Jean-Louis Consalvi (right)

Signed: Yi Wang

Ghent University

PhD student Zhan Wang strengthens the team

PhD student Zhan Wang arrived in Ghent by the end of March. Zhan performs PhD research on smoke behaviour in case of fire in double-deck tunnels with transverse ventilation and water mist. It is a joint PhD with Wuhan University. His promoters at Ghent University are Georgios Maragkos, Tarek Beji and Bart Merci.

Dr. Xiepeng Sun received The IAFSS Best Thesis Award – Region Asia Pacific

Xiepeng Sun performed his PhD research on ‘Experimental and Theoretical Study on the Ejected Facade Flame Behavior from Compartment Fires under Different Ventilation Conditions’ under the joint supervision of Prof Longhua Hu (USTC) and Prof Bart Merci (Ghent University) and obtained a joint PhD degree from both institutes. The quality of the work was recognized by IAFSS (the International Association for Fire Safety Science), granting dr. Sun the prestigious 3-yearly Best Thesis Award (Region Asia Pacific).

Dr. Martin Thielens wins IWMA Young Talent Award for his PhD Thesis

Since 2016, the IWMA (International Water Mist Association) scientific council evaluates submissions from scientists applying for the [IWMA Young Talent Award](#). Former IMFSE lecturer and MFSE alumnus Martin Thielens is granted the award in 2023 for his PhD thesis (“Advanced Computational Fluid Dynamics Modelling of Water Sprays in Fire-Driven Flows”), under supervision of Profs Tarek Beji and Bart Merci.

Signed: Silke Van Parys

Imperial College London

Hello friends of Hazelab! Welcome to another update from Hazelab at Imperial College London. For more news, follow us on twitter @ImperialHazelab, visit our [website](#) or watch our [video](#).

Graduating Students

Dr. Han Yuan & Dr. Zhenwen Hu came back to Imperial with their families to participate in the Ph.D. graduation ceremony, held annually at Albert Hall, it was exciting! We are also very happy to congratulate Dr. Simona Dossi for completing her Ph.D. on protecting communities from wildfires. Cheers to the new graduate! Best wishes for your future!

As usual, every new member of Hazelab writes a research statement and takes a photo at their favourite location. Dr. Hafizha (Afi) Mulyasih chose to take a photo in front of an iconic Imperial Guild clock, and Dr. Carlos Walker-Ravena chose to take a photo in the Hyde Park area near Imperial College London with an equestrian statue called Physical Energy in the background, a symbol of the dynamic force of ambition, very philosophical!



Conferences and Outreach

Several trips to various locations in the UK and other countries were made to attend in-person activities such as presentations, conferences, and visits.



The SFPE Conference 2023, Berlin

Harry Mitchell, Rikesh Amin, Dr. Matt Bonner and Simona presented their work at the SFPE Conference in Berlin 2023. Nick Kalogeropoulos and Carlos travelled to Cyprus in May to introduce themselves to the Cypriot team. Imperial College London conducted a research showcase for Wildfires and Battery research on 11 May, and Harry presented about Timber Fire. The day after, Harry went to Edinburgh to attend the Structures in Fire Forum (STiFF). Indeed, he is the most mobile person!

Then, from the end of May to the beginning of June, Harry, Nick, Carlos, and Afi went to Washington DC, USA, to visit NIST. While at NIST, we met Eric Mueller, one of the

researchers at NIST. We presented our research overview and had the chance to tour the lab, which was very impressive.



A few days later, we attended the summer school at UMD! Prof. Guillermo Rein gave a lecture there about smouldering wildfires. All of the lecturers provided knowledge and research findings that were insightful and fascinating, and the students were also extremely exceptional. Additionally, we had the chance to display the findings of our investigation as posters. Hopefully, activities like this will continue every year!

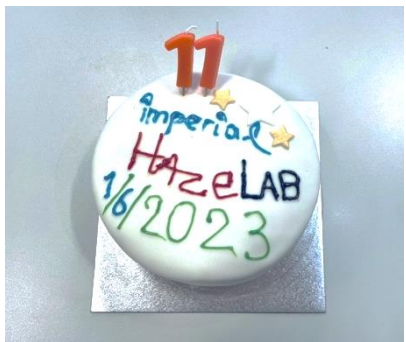


NIST Laboratory, Maryland



Summer School UMD, Maryland

One of the most important things to remember is that June 1st is the anniversary of Imperial Hazelab! This is the 11th year! we celebrated by buying a cake, then we decorated it ourselves! It was so funny!



The World Conference on Timber Engineering, Oslo

Harry attended the World Conference on Timber Engineering in Oslo, Norway on June. He was presenting on the smouldering of mass timber! On another occasion, Imperial held a research poster exhibition to celebrate International Women in Engineering Day on June 20, and Afi participated in showcasing her research on peat fire suppression methods, which was part of her PhD thesis research.

Rik also presented his research using AI to improve the safety of tall-timber construction during the Ph.D. Research Poster Showcase held at Imperial in July. In the same month, Nick and Afi attended the Leverhulme Wildfire Summer Conference which was held on July at Imperial College London. They each presented their research posters.



The Leverhulme Wildfire Summer Conference, London

In other news, Guillermo visited the UL Research Annual Symposium at Evanston, USA, in August. The conference's events appeared to be really exciting!



The UL Research Annual Symposium, Evanston

Francesca Lugaresi, Nick and Harry's papers are accepted in the Fire Safety Journal and will be presented at the IAFSS Conference in Tsukuba, Japan, in October 2023! Can't wait for the next excitement!

Follow this link to [Hazefiles](#), our repository of papers and reports!

Visitors

Without visitors, Hazelab days would not be as lively. Visitation activities can improve communication between researchers. Recently, we've had some visitors who came to present their research as well as to see the lab. The Hazelab team is delighted to have them join us and looks forward to welcoming many more guests!

Dr. Thomas Smith from the London School of Economics presented his work on tropical peatland fires in Indonesia and Malaysia. We really enjoy learning about the socio-environmental perspective of peat fires.

Dr. Nieves Anez and colleagues from HVL, Norway, visited us in April. During those days, we shared and discussed various interesting fire science-engineering studies.



Dr Nieves Anez and colleagues at HVL visiting Hazelab, April 2023

Seminar: Ed Ang
How safe is safe, and for how long? - An Engineering Design Perspective



Bio: Ed Ang is a technical director at AECOM Australia, and a PhD researcher with Hazelab. With over 16 years of industry experience, he is a chartered professional engineer in Australia and the UK, specialising in mechanical and fire safety. Throughout his career, Ed has been involved in various large-scale infrastructure and building projects as a multidiscipline design manager, project manager, or specialist.

Abstract: In this seminar, Ed Ang will explore the challenges that engineers face when designing safe and sustainable infrastructure and buildings. With a focus on actual project design, Ed will examine the various factors that govern safety and discuss how new technologies and climate change impact safety considerations. Specific examples, such as tunnels that need to consider changing vehicle technologies will be discussed. This is intended as a dialogue, and please join us to explore the implications of designing safe infrastructure and buildings in a rapidly changing world.

2nd May 13:00 – 14:00 GMT
 g.rein@imperial.ac.uk
 CAGB 575 and Online

IMPERIAL HAZELAB Imperial College London

In May, Ed Ang an engineer at AECOM and a Ph.D. researcher at Hazelab, gave a webinar talk about an engineering design perspective. In this seminar, he explored engineers' challenges when designing safe and sustainable infrastructure and buildings. He discussed how new technologies and climate change impact safety considerations.

Dr. Augustin Guibaud from UCL talked about fires in microgravity and his series of experiments aboard the famous zero G parabolic flights when he visited us in May.

Prof. John Gales and his student from York University, Canada, came to our lab! We had extensive discussions regarding the building's structure, fire risk, and human behaviour towards means of egress.

Dr. Michael Kinsey from Movement Strategies and UK colleagues visited Hazelab and talked about how people will behave during a fire evacuation to ensure the buildings are safe. This discussion was really fascinating!

Researchers led by Prof. Longhua Hu from the **University of Science and Technology China (USTC)** presented their current research on external fires from compartments, where they conducted a number of experiments on their large fire laboratory. Very exciting research!



Prof John Gales visiting Hazelab, May



Dr Michael Kinsey visiting Hazelab.



The EU ambassador came to visit Hazelab

The new EU ambassador to the UK, Pedro Serrano, came to visit the college this year, and among the labs and people he visited was Hazelab. The research group discussed our current work with him and the importance of our European collaborators. From an article about the visit: "They

discussed how the group works with partners across Europe and beyond to reduce the worldwide burden of accidental fires and their impact on people, property and the environment, for example through different building regulation and community action."

In a similar vein, the Chinese Minister Councillor for Education Affairs, Ms. Zhang Jin, visited Hazelab, where we discussed our work on fire, the contributions of our numerous Chinese graduates, and the opportunities the Chinese government provides to Chinese students to join Imperial.



The Chinese Minister Councillor visited

Awards

Afi won a prize for the best poster on fire in relation to land management, conservation, livelihoods and health in the Leverhulme Wildfires Conference.

Congratulations to Nick, who successfully got the Spring 2023 Student Research Grants from work on wildfire evacuation by the SFPE Foundation!

We are thrilled to announce that Harry received the 2022 Dr. Ashraf Ben El-Shanawany Memorial Award, which highlights a student in the Imperial Mechanical Engineering Department who has shown exemplary research, innovation, and outreach to the public during their studies. Harry attended the award ceremony to grab the medal!



SFPE Greater London Student Chapter

The SFPE Greater London Student Chapter has been busy organising Fired Up, when held on 27 – 29 July 2023, an event by students for students! Fired Up is an event for students to present their work without feeling academic pressure, to practice their presentation and question-answering skills, or to explore the vast network of fire research in the UK. The two days' event was a success!

Signed: Nikolaos and Afi, Edits by Harry and Guillermo

International Master of Science in Fire Safety Engineering

8th IMFSE Fire Safety Engineering Day at UPC in Barcelona

On 28 April 2023 the 8th IMFSE Fire Safety Engineering Day was held with 'Fire Safety Challenges of New Energy Vectors' as the central theme of the day. Approximately 50 IMFSE students, several IMFSE academics from the core partner institutes and representatives from several IMFSE contributing companies participated in this event. This event was truly remarkable as it was organized at Universitat Politècnica de Catalunya (UPC), which became one of the IMFSE full partner universities since September 2022.



IMFSE Graduation ceremony: class of 2023

On 22 June, the IMFSE class of 2023 graduated in Ghent during the IMFSE Graduation Ceremony. It was a wonderful event where all graduating students gave a thesis presentation and presented their thesis poster. There were also several speeches given by some of our alumni and program directors. The evening activity involved food, music and comedy. Congratulations to all graduates! Check out our [Facebook page](#) for more pictures.



New IMFSE Contributor: Danfoss

Recently IMFSE welcomed [Danfoss](#) as one of the IMFSE contributing companies. The financial contribution of the

IMFSE contributing companies makes it possible to offer full and partial scholarships. You can find more information about all of our contributors on <https://imfse.be/contributors>.

Rita Fahy - October 4, 1955 ~ July 12, 2023

The IMFSE family shares condolences on the loss of Dr Rita Fahy. Rita has been involved in the IMFSE programme as visiting scholar since the start at Lund University, in her role as renowned world expert on evacuation and human behaviour in fire. She had a key role in developing the Human Behaviour in Fire course at Lund University and acted as a generous and knowledgeable mentor for younger colleagues and students. Her lectures have always been extremely much appreciated by students and colleagues. It is fair to say that Rita's genuine passion for fire safety has been a source of inspiration for the whole IMFSE community and contributed to shape several generations of fire safety engineers. Rita, thank you very much for everything. You are, and will always be, missed, but never forgotten.



IMFSE program director Bart Merci receives the Arthur B. Guise Medal



The IMFSE is proud to share that IMFSE Program Director Prof Bart Merci (Ghent University) has been awarded the [Arthur B. Guise Medal](#), issued by the SFPE Foundation. Prof Merci receives the Medal as recognition for the research on CFD in fire safety science and engineering, as well as for his leadership in the IMFSE program.

Awards and prizes IMFSE alumni

SFPE Foundation: Jack Bono Award for Engineering Communication for Silvia Arias

Silvia Arias (Lund University) graduated in 2013 and is one of the recipients of the [Jack Bono Award for Engineering Communication](#). The recipients received their award for their article "[A Study on Evacuation Behavior in Physical and Virtual Reality Experiments](#)." Endowed by UL Research Institutes, this award recognizes author(s) who have most contributed to the advancement and application of professional fire protection engineering in the prior year.



SFPE foundation awards 2023 Student Scholar Award to Pascale Vacca
Pascale Vacca graduated in 2017 and was awarded a 2023 [Student Scholar Award](#). This award aims to recognize outstanding undergraduate, graduate, or post-graduate students performing research to advance the science and practice of fire protection engineering worldwide.

Signed: Silke Van Parys

King's College



King's Heat and Fire lab started in 2019 by Dr Francesco Restuccia at King's College London. Since 2021, we have had 3 PhD students join and who are currently working on Fire Science Research. Our PhD Students are Imogen Richards, Hosein Sadeghi, and Alankrita Mamgain. We have been very happy to host Zilong Wang, PhD Student from Hong Kong Polytechnic University, for the past 4 months.

A new research project was granted this year to the group from the Faraday Institution focusing on flame propagation in thermal runaway of batteries. This is part of the major governmental awards on battery research, as part of the project SAFE-BATT, and we are excited to focus on modelling fire spread in batteries for the next few years and are recruiting a new PDRA for this project.

Signed: Francesco Restuccia

Luleå University of Technology

Project on biomolecules and phytic acid as flame retardants

In a new project funded by Brandforsk (Swedish Fire Research Foundation) "Inhibit Fire with Molecules from Nature – Application on Textiles", <https://www.brandforsk.se/en/research-projects/2023/inhibit-fire-with-molecules-from-nature-application-on-textiles/>, a selection of biomolecules called purines will be investigated in combination with phytic acid as possible flame retardants for textiles. Two examples of purines are adenine, which is part of the DNA molecule, and theophylline, which is found in tea, chocolate, and coffee. The compounds are naturally occurring and harmless to humans and the environment and can be extracted from renewable resources, such as different waste materials or fermentation broths. The investigations will range from molecular level to large-scale fire demonstration experiments to assess the performance of the flame retardants on different textile materials. Project leader is Associate Professor Anna-Carin Larsson, Chemistry of Interfaces, Luleå University of Technology (LTU), Sweden. The members of the project team are Dr Biplab Roy, Chemistry of Interfaces, Dr Rhoda Afriyie Mensah, Structural and Fire Engineering, and Dr Josefine Enman, Biochemical Process Engineering, all of which from LTU, and Dr Ragni Fjellgaard Mikalsen and MSc Edvard Aamodt, from Rise Fire Research, Trondheim, Norway. Photo shows Biplab Roy and Rhoda Afriyie Mensah running Microscale Combustion Calorimeter at LTU.

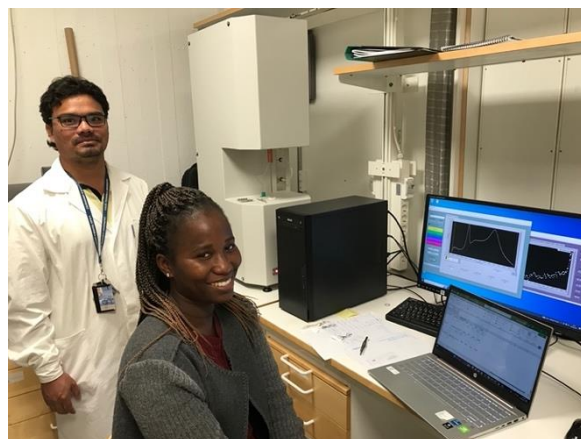


New colleague: Joakim Sandström

Joakim Sandström is a senior lecturer in structural fire safety engineering. Joakim did his PhD 2019 on the Life Safety Objective in Structural Fire Safety Design where he focused on design targets and functional requirements in structural fire safety design. His background also includes 15 years of experience as a fire consultant and a degree as Fire Engineer at Luleå University of Technology. The work in Luleå will initially be much teaching as head of the fire

engineering program.

New colleague: Dong Wang



Dong Wang is doing his PhD student in the field of biochar added concrete with emphasis on the fire resistance and energy conversation, at the division of structural and fire engineering. The background for the research stems from the high carbon emission of cement production and extensive wood wastes. It is therefore necessary to replace the cement in concrete with biochar, a biobased and environmental friendly material. Dong is material engineer from Xiangtan University and Hunan University of Arts and Science with a diversified background with considerable knowledge in concrete materials research, including ultra-high performance concrete, alkali-activated concrete, and simulation as well as life cycle assessment. Dong's previous research explored sustainable concrete with coral aggregates and other wastes.



New colleague: Lucas Andersson



also been deeply engaged with the new Swedish building regulations, and its impact on the building industry.

Lucas Andersson is a PhD student at Structural and Fire Engineering. Lucas will work with hydrogen explosion safety within a project called "Research and Innovation in Norrbotten for Advanced Green Steel Production and Manufacturing" and also at the CH2ESS centre. Lucas has worked in the industry as a fire protection consultant at the consultancy companies AFRY and Briab since graduating from the master programme in fire engineering at Luleå University of Technology in 2018. His focus has been performance-based design of both structural fire protection and evacuation strategy using different calculation methods and models. Lately, he has

New equipment: Cone calorimeter and microscale combustion calorimeter (MCC)

The university has received funding from Kempestiftelserna and the university's lab fund for replacing the existing cone calorimeter with a new one, see photo below, and for a new MCC. The MCC is seen in figure 1 above. The photo to the right shows the new cone calorimeter from Netzsch. Foreground: the happy and grateful reserachers Dong Wang, Rhoda Afriyie Mensah, and Oisik Das.



Signed: Michael Försth

Lund University

Education

In August the first students to our new local 5-year program in Fire Safety Engineering arrived in Lund. This one-of-a-kind program will give the students broad engineering skills and in-depth knowledge in fire science. During the latter part of the program the students will be able to specialize in fire safety analysis or accident management. If you would like to learn more about the new program, please contact nils.johansson@brand.lth.se

Research

Fire Safety Engineering at Lund university continues to expand interest and collaboration in the field of wildfire preparedness and response. Two new projects have been developed recently connected to this field:

Research on tourist vulnerability to wildfires

Amina Labhiri has joined our division during the summer 2023 to take part to the Eu-funded WUITIPS project (led by the Polytechnic University of Catalunya) as research assistant. Amina reviewed critical aspects related to the vulnerability of tourist population during wildfires, with particular emphasis on the definition of archetypes of possible behavioural responses during a wildfire emergency. This work includes a literature review and an interview study and will continue with a set of modelling case studies during 2024 to be performed within her thesis work at the International Master of Fire Safety Engineering (IMFSE). She conducted this research under the supervision of Dr Enrico Ronchi.

Stakeholder responsibility for wildfire safety from a Swedish perspective

Lucas Hovart has joined our division during the summer 2023 to take part in the FORMAS funded project (led by Professor Margaret McNamee) to investigate stakeholder understanding of wildfire risks in Sweden and their responsibility in relation to this risk. Lucas has started by investigating the question of stakeholder responsibility for wildfire safety. We are particularly happy to include Lucas in the project due to his previous experience in

stakeholder involvement, albeit not in wildfire research, and his background with a master's in social science. He will be a great addition to the team.

These projects add to the existing portfolio related to wildfires including, e.g. research connected to WUI-NITY, multi-hazard evaluation methods and understanding developing capability needs in the fire service to meet future hazards.

Other research activities include a set of new projects:

Participation in a new interdisciplinary group "Sound of Democracy"

Given his research activities in the area of evacuation alarms, Dr Enrico Ronchi has been asked to take part in a newly formed theme called "Sound of Democracy" at Lund University's Pufendorf Institute of Advanced Studies. The Pufendorf IAS is an interdisciplinary institute at Lund University supporting researchers from all faculties at Lund University – from science and medicine to the humanities to work together on a scientific problem. A theme consists in a 1-year interdisciplinary project in which a group made of researchers from different faculties tackle a problem from different angles. In fire safety, the way people perceive sound and alarms is a crucial aspect and will be one of the key topics investigated this year at the institute.

Pedestrian and Evacuation Dynamics event

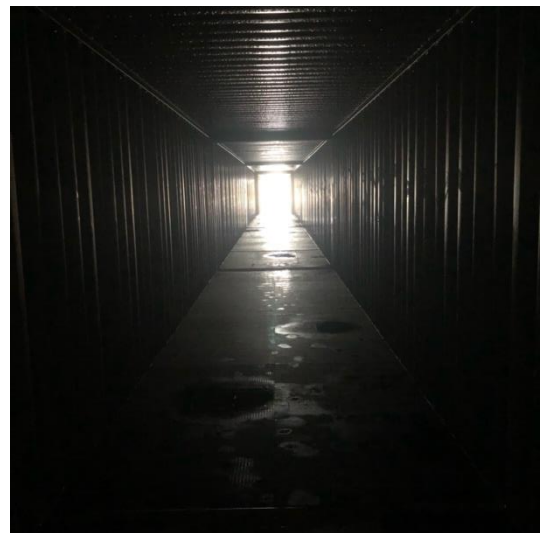
Dr Enrico Ronchi was co-chair of the last event of the Pedestrian and Evacuation Dynamics group, co-organized by researchers at the Technical University of Eindhoven Forschungszentrum Jülich and Lund University in Eindhoven, the Netherlands on the 27-30th of June 2023. Our division was involved in teaching in the educational workshop and five scientific contributions (2 oral presentations and 3 posters). Dr Enrico Ronchi will also be co-editor of two Special Issues associated with the event, to be published in the Safety Science journal and the Collective Dynamics journal.

Reuse of building materials and products with fire requirements

The construction sector generates a significant share of the total material flows and waste in society. There are many activities focused on reducing construction waste and the issue of material and product reuse has received increasing attention in recent years. However, very little work has focused on products associated with fire safety requirements. Together with RISE Research Institutes of Sweden, Bengt Dahlgren Fire and Risk Consulting and Skanska, our division has been investigating opportunities and barriers (both regulatory and market) to reuse of building material and products with specific fire safety requirements.

Tunnel fire research

The construction of our 60 m medium-scale tunnel for fire tests is soon completed (see picture to the right). The tunnel will be used for both research projects, education, and master thesis projects. As an example, students in our fire dynamics course will use the tunnel as a room-corridor scenario in one of the labs in the course.



Positions and personnel

Dr. Konrad Wilkens has joined the division as researcher in February 2023. Dr Wilkens comes most recently from The Danish Institute of Fire and Security Technology (DBI), where he was employed when he defended his thesis: "[Fire Behaviour of Upholstered Furniture Component Materials at Multiple Scales](#)".

Several new PhD students have either already joined or are scheduled to join the division in 2023. Evalyne Arinaitwe became a part of the division as a PhD student in early 2023 and will focus on researching the environmental impact of fires under the guidance of Professor Margaret McNamee. Lucas Hovart also became a PhD student within the division during the summer of 2023. His research will revolve around stakeholder responsibility for wildfire safety, and he will be working under the supervision of Professor Margaret McNamee.

More information

More information about the Division, are available on www.brand.lth.se. Our website is continuously updated with news.

Signed: Nils Johansson

University of Maryland

Arnaud Trouvé Appointed FPE Department Chair

On July 30, 2023, Arnaud Trouvé was appointed Chair of the FPE Department. He will continue to serve as professor and graduate director. Please join us in welcoming him to this new role!

Trouvé earned his Engineering Degree, M.S., and Ph.D. from the École Centrale of Paris, France. He joined UMD in 2001. He is a fellow of the Combustion Institute and the recipient of the 2017 FORUM Sjölin Award. He serves on the editorial boards of the Fire Safety Journal and Combustion Theory and Modelling. He has organized several conferences at UMD, including the Eastern States Section of the Combustion Institute, the IAFSS (2011), and the U.S. National Combustion Meeting. He has served as Chair of the International Fire Safety Consortium and of the Eastern States Section of the Combustion Institute and as executive board member of the IAFSS. He co-leads the IAFSS MaCFP Working Group.

His research interests include fire modeling and CFD, data assimilation for fire and combustion, and the physical modeling of combustion- and fire-related phenomena, including compartment fires, wildland fires and explosions.

Trouvé would like readers to know that, *Over the past three decades, the FPE Department has earned a reputation of excellence, not only in the education of fire protection engineers, but also in the advancement of fire science. The Department played a prominent role, both in the FPE profession and in the fire research community. I intend to carry forward those activities and to renew the commitment of the Department to the practice and to the science. We have exciting new challenges ahead, for instance, the development of an online delivery of our undergraduate B.S. program, and also the adaptation of our teaching portfolio and research capabilities to new problems (fire safety in the WUI, Li-ion battery systems, mass timber buildings, etc.) and to new technologies (AI and machine learning, new fire sensors, Unmanned Aircraft Systems, Virtual Reality, etc.). Meeting these challenges will require the help of the entire FPE community and I look forward to working with our vast network of colleagues and alumni to write this new chapter of the Department.*

Jim Milke Retires From UMD

Jim Milke retired from UMD on September 1, 2023. Please join us in wishing him well!

Milke earned his degrees from Ursinus (B.S.) and UMD (B.S., M.S., and Ph.D.). He worked for several years as a firefighter and a fire marshal. He began his employment at UMD in 1977, became a tenure-track faculty in 1991, and became Chair of the FPE Department in 2011.

Milke has received seven best paper awards, the Kent Outstanding Teaching Award, the SFPE Ahern President's Award, the Automatic Fire Alarm Association Person of the Year, the SFPE Guise Medal, the NFPA Distinguished Service Award, the SFPE Bryan Mentoring Award, and the AFSA Parmelee Award.



Milke organized and hosted the inaugural 2022 Fire and Life Safety Ecosystem Symposium, in collaboration with the NFPA. He spearheaded the \$3M fundraising goal for the Professor of Practice Endowment, which has been renamed the James A. Milke, Ph.D., Fire Protection Engineering Professorship of Practice. In honor of the ideals Milke and his wife Judy Milke hold dear, they have created the James A. Milke Scholarship in Fire Protection Engineering.

Milke was honored by the A. James Clark School of Engineering on May 1, 2023, and will be honored again at an alumni dinner on October 7 during the SFPE Annual Conference and Expo in Bethesda, MD.

International Fire Safety Consortium Releases Free, Open Access Video Webinar Series on Wildland Fires in Partnership with UL's Fire Safety Research Institute and UMD

The International Fire Safety Consortium (IFSC, <https://intlfire.org>), a network co-led by UMD that brings together leading higher-education institutions and fire safety research organizations from around the world, has announced the release of a new series of free, open access educational video webinars on wildland fires, in partnership with UL's Fire Safety Research Institute (FSRI).

The webinar series is expected to bring visibility to the research community in fire safety engineering and to promote much needed interactions between fire safety engineers, fire ecologists, atmospheric scientists,

geographical scientists and beyond. Comprised of 31 videos, the series offers a 15-week, 3-hours-per-week format, and provides a basis for an educational course on wildland fires in an academic engineering program. The webinars address such topics as fire behavior, fire ecology, weather and atmospheric science, fuel ignition, flame spread, fire emissions, and mitigation measures.

The new wildland webinar series represents a community-level effort, featuring a diverse group of leading experts on wildland and WUI fires. The webinar videos feature 29 instructors, mostly from the U.S., Australia, and Europe.

The videos are hosted on FSRI's Fire Safety Academy online learning platform and are accessible at <https://fsri.org/program-update/ifsc-wildland-fires-webinar-series>. All videos are provided for viewing or for download, for personal information, and for possible non-commercial reuse, and are licensed under a Creative Commons license CC BY-NC 4.0. FSRI, a part of UL Research Institutes, the nonprofit research organization within the UL enterprise, advances fire safety knowledge to address the world's unresolved fire safety risks and emerging dangers and is a member of the IFSC.

The IFSC brings together worldwide expertise to tackle emerging fire safety challenges, engaging in research, education, and collaboration with industry, government, and non-governmental organizations. IFSC members and partners include: University of Maryland, University of Edinburgh, Lund University, University of Melbourne, University of Queensland, Ghent University, University of California, Berkeley, UL Research Institutes, and FSRI.

UMD Hosts Fire Safety Science Summer School

UMD hosted a Fire Safety Science Summer School during June 4–9, 2023. This was attended by 47 students – consisting of Ph.D. students, early-career researchers, and consultants – and 22 instructors and panelists from around the world. It was organized by Arnaud Trouvé.

The program focused on the behavior of wildland and WUI fires via an engineering-based lens. Participants were exposed to a broad range of related advanced topics with a mix of fundamental seminars (emphasizing the underlying physical and chemical mechanisms) and general courses (describing the scope of real-world problems, while emphasizing challenges in finding solutions to mitigate the negative effects of these fires) such as firebrands, soot and radiation, human behavior in WUI fires, rate-of-spread models, and regional-scale fire risk modeling. The program also gave participants ample opportunity to network and foster international collaboration. The PPT presentations and video lectures are available at <https://ssfss2023.umd.edu/program/>.



The summer school was financially supported by the UMD Burgers Program for Fluid Dynamics and by the Combustion Institute. Most students were offered access to the school without any registration fee and with free lodging at a local hotel (a few students from private organizations were asked to pay a registration fee). The UMD faculty featured in the seminars were Evan Ellicott, Stanislav Stoliarov, Peter Sunderland, and Arnaud Trouvé.

Shuna Ni Receives Two Research Grants

Shuna Ni has been awarded a grant from UMD's Grand Challenges Program. Its title is *Understanding the Impact of Wind on Fire Dynamics in Mass-Timber Compartment*. It will generate a holistic understanding of the impact of wind on the fire dynamics of mass-timber structures and provide reliable modeling techniques and simplified methods for modeling, or estimating, mass-timber building fires, in both windy and windless environments.

Ni has also been awarded a grant from the National Institute of Justice (NIJ). Its title is *Investigating the Impacts of Architectural Finishes on Fire Patterns in Support of Developing Data-driven Tools for Pattern Analysis*. This two-year project will analyze how architectural finishes affect fire patterns and facilitate the creation of data-driven tools for pattern analysis; thus, aiding the field of fire forensics and ultimately saving lives. The impact of architectural finishes on fire patterns has been previously overlooked in fire forensics. Interpretation of fire patterns on walls and other surfaces is integral to the investigation of any fire incident. The project will develop automated, AI-based tools for data collection and processing. Stanislav Stoliarov will serve as Co-I.

Fernando Raffan-Montoya Receives Grand Challenges Research Grant

An interdisciplinary UMD team has been awarded a grant from UMD's Grand Challenges Program. Its title is *Observing Wildfires Through UAVs and Fire Imaging Technologies*. The PI team includes Fernando Raffan-Montoya and Arnaud Trouvé along with Lina Castaño (Aerospace Engineering). The project will leverage recent advances in technology, particularly unmanned aerial vehicles (UAVs) and fire imaging technologies, to develop

observational data that can be used to increase the understanding of wildfires and WUI fire behavior, while providing innovative solutions to incident response. The team will also be supported by UMD's UAS Research and Operations Center (UROC) and the Maryland Autonomous Technologies Research Innovation and Exploration (MATRIX) Lab.

Wildfires and WUI fires have increased significantly as of late due to poor land management policies, the increasing human population in the WUI, and climate change. The team's research will address some key barriers to mitigating wildland fire risk, attributed to the limited fundamental understanding of wildland fire dynamics caused by the lack of high-quality, time-resolved observational data. In particular, the study will focus on autonomously tracking the fire line and dynamically measuring the flux of firebrands produced during a wildland or WUI fire; the data will be assimilated into numerical models that can help forecast the behavior of wildland fires.

Peter Sunderland Receives NSF Research Grant

Peter Sunderland received an award from NSF for a three-year research project. Its title is *Cool Pool Diffusion Flames*. Cool diffusion flames are unusual due to their low temperatures – between 500 - 1000 K. Their discovery in 2012 has already resulted in an improved understanding of ignition; however, further progress in related research has been hindered due to the high cost and complexity of the required experimental facilities, such as the International Space Station.

This project seeks to reduce this cost by developing a novel facility that burns fuel pools in cool flames. It will perform detailed measurements and simulations. The initial fuels will be pure hydrocarbons that are liquid at room temperature. It is unknown which of these fuels can burn in air as cool diffusion flames, and at what temperatures and mixture fractions. Cool flame chemistry may contribute to fire ignition, smoldering, and spread. Advanced internal combustion engines that leverage cool flame chemistry may result in an increase in thermal efficiency from 39 to 60%.

Jim Milke Receives NSF Research Grant

UMD, in collaboration with Morgan State University, has received an NSF grant in the first-of-its-kind funding support for behavioral fire research. The project, entitled *Excellence in Research: Human Visual Perception of Changes in Smoke and Flame Cues during Early Fire Development*, is funded through June 2024 and aims to study the responsiveness to environmental indications of fire through the in-depth analysis of human behavior in diverse situations and physical cues. Identifying whether a real threat is present is a crucial step in taking decisive action. To fully account for the wide range of variables that are required for such action, the study employs a uniquely interdisciplinary approach. The research findings will also be used to improve fire safety systems, especially those found inside of homes. Milke will serve as the project Co-I.

Human subjects will participate in the study and be prompted to make decisions and judgements in response to software-simulated building fires. Past studies observed that initial signs of a fire tend to be ambiguous, with occupants often investigating the source. Exploring this connection, the research will identify the extent to which dynamic changes in fire cues are used by occupants to assess the posed risk of a fire and influence pre-movement decision making, which can be incorporated into theoretical models of occupant behavior.

Jim Milke Receives NFPA 2023 Distinguished Service Award

Jim Milke was honored by the NFPA with the 2023 Distinguished Service Award. This award recognizes the outstanding accomplishments of individuals in service to the NFPA and the promotion of the field of fire safety. The award honors recipients whose dedication and commitment to the organization's mission are longstanding and encompass multiple areas of involvement and impact.

In addition to being a life-member of the NFPA, Milke is a former member of the NFPA Standards Council and NFPA Fire Tests Committee, as well as a current member and past chair of the NFPA Committee on Smoke Management Systems. He is a fellow and past president of the SFPE, and after the 9/11 attacks, he served on FEMA's Building Performance Study Team that investigated the World Trade Center catastrophe.

Five UMD/FPE alumni were recognized for an array of awards at the 2023 NFPA Conference and Expo. The other four awardees were former FPE students who were taught and/or mentored by Milke: Jerry Back, (FPRF Medal); Casey Grant, (FPRF Medal); Grunde Jomaas (Bigglestone Award); and Daniel O'Connor (Standards Medal).

Jim Milke Receives AFSA 2023 Henry S. Parmelee Award

(Submitted with permission from the AFSA)

In 1983, the American Fire Sprinkler Association (AFSA) created its highest honor, the Henry S. Parmelee Award, to recognize an outstanding individual who has been dedicated to the fire sprinkler industry and the goal of fire safety through automatic sprinklers. The recipient of this year's award has dedicated over 40 years of his life to the industry and its people and perhaps, more importantly, its students. He is an educator, mentor, leader, and above all else, a well-respected professional in the fire protection industry. For AFSA, it is an honor to recognize Jim Milke with the 2023 Henry S. Parmelee Award.

Milke plans to continue working part-time at UMD: *I don't plan on evaporating and not touching fire protection again. I'll still help with the department, teach a couple of classes, maybe take on a special project here or there. Otherwise, I'd love to stay involved with the standards committees that I'm on now.*

AFSA presented Milke with this award at the general session of the AFSA42 Convention, September 6-9, 2023, in Orlando, Florida.

Kyra Cromwell Reed Receives 2023 Bryan GRA Award

Kyra Cromwell Reed, a 2023 graduate of the UMD FPE B.S. program, is the recipient of the John L. Bryan Graduate Research Assistantship Award for the 2023-2024 academic year. Reed has served as President of the SFPE UMD student chapter, and as Secretary of the Salamander Fire Protection Honorary Society. Reed also served as an ambassador of the A. James Clark School of Engineering, and a mentor for the UMD Women in Engineering program. Her M.S. advisor is Fernando Raffan-Montoya.



Parham Dehghani Receives IAFSS Best Thesis Award

Parham Dehghani has been awarded the IAFSS Best Thesis Award for the Americas. His Ph.D. dissertation title is *Burning Emulations of Condensed Phase Fuels Aboard the International Space Station*. Dehghani was advised by Peter Sunderland and James Quintiere. He previously earned a B.S. (Shiraz University) and a M.S. (Sharif University of Technology).



Dehghani is currently a postdoc at Underwriters Laboratories. He will be recognized at the IAFSS Symposium in Tsukuba, where he will give a presentation.

Assistant/Associate Professor Position Announcement

The FPE Department has announced the opening for a tenure-track faculty position. Details are at <https://ejobs.umd.edu/postings/111664> and <https://fpe.umd.edu/news/story/applications-open-for-two-faculty-positions>.

For best consideration, applications should be submitted by 11/28/2023. For more information, please contact Stanislav Stoliarov (stolia@umd.edu), Search Committee Chair.

Clinical Assistant/Associate/Full Professor Position Announcement

The FPE Department has announced the opening for a professional-track faculty position to help in the development of a new online delivery method for the UMD undergraduate FPE/Bachelor-of-Science program. Details are at <https://ejobs.umd.edu/postings/111292> and <https://fpe.umd.edu/news/story/applications-open-for-two-faculty-positions>. The faculty member will: assume the position of Director of the online FPE undergraduate program; take oversight responsibilities for its operation; teach courses; and facilitate involvement with professional societies, standards organizations and representatives of industry. The preferred candidate will be familiar with or strongly interested in best practices for online education. A master's degree and at least four years of experience in the practice of FPE is required.

For best consideration, applications should be submitted before 11/15/2023. For more information, please contact Jim Milke (milke@umd.edu) and/or Arnaud Trouvé (atrouve@umd.edu).

Signed: Peter Sunderland

Universitat Politècnica de Catalunya

People updates



Dr. Pascale Vacca was awarded her PhD with the thesis titled “Fire risk analysis framework at the wildland-urban interface”, supervised by Dr. Elsa Pastor and Dr. Eulàlia Planas. The thesis presented a performance-based methodology for the quantitative risk assessment of Wildland-Urban Interface (WUI) scenarios, along with a methodology for the quantitative vulnerability assessment of buildings located at the Mediterranean WUI. The result of her thesis are published in four journal papers (*Safety Science*, *International Journal of Wildland Fire*, *Journal of Safety Science and Resilience*, *Chemical Engineering Transactions*).

Dr. Pascale Vacca was also the recipient of the **SFPE Student Scholar Award 2023** that recognize students who are performing research to advance the science and practice of fire protection engineering.

Academic updates

We are very happy that Universitat Politècnica de Catalunya is now one of the Full Partner Universities of the International Master of Science in Fire Safety Engineering (IMFSE).



Image taken during the IMFSE Fire Safety Day held in Barcelona in April 2023.

In this context, last April UPC hosted the 8th IMFSE Fire Safety Engineering Day with the central theme “*Fire Safety Challenges of New Energy Vectors*”. This event brings together the IMFSE students, academics, alumni and contributors in a unique annual opportunity to discuss about a hot FSE topic.

This September the first IMFSE students arrived at UPC, we are very excited about the time we will spent together with courses in Advanced Fire Safety Engineering, Wildland Fire behaviour and Modelling, Risk and Vulnerability at the Wildland-Urban Interface and Risk and Safety at the Chemical Industry.

Projects updates

Wildland-Urban-Interface Fire Touristic Infrastructures Protection Solutions – WUITIPS project, started on February 2023 and will end January 2025. It is a project financed under the EU Civil Protection Mechanism, coordinated by Prof. Elsa Pastor from the UPC team (Centre for Technological Risk Studies – CERTEC) and done in collaboration with University of Lund (Enrico Ronchi), Efectis France (Bruno Guillaume), Entente pour la Forêt Méditerranéenne (Philippe Meresse) and Diputació de Girona (Maria Pipió). WUITIPS aims to explore and characterize vulnerabilities and performance of risk mitigation measures in tourist facilities as well as the associated population, in emergencies due to forest fires in cross-border situations across EU. With this knowledge captured, WUITIPS will develop an EU harmonized guideline for fire prevention and protection planning in touristic infrastructures, together with new methods and tools to analyse vulnerability of assets and people.

Smart Integration of Process Systems Engineering & Machine Learning for Improved Process Safety in Process Industries – PROSAFE, Marie Skłodowska-Curie Actions Doctoral Network. Will start on January 2024 and end in December 2027. Coordinated by Prof. Gürkan Sin from the Danmarks Tekniske Universitet (DTU) and with Universitat Politècnica de Catalunya (Prof. Eulàlia Planas), Imperial College London (Prof. Alessandra Russo), the Norwegian University of Science and Technology (NTU) (Prof. Johannes Jäschke). Applus Norcontrol SL (Dr. Miguel Muñoz), Kairos Technology (Dr. Claus Myllerup), Risktec Solutions (Mr. Steve Pearson), Port de Barcelona (Dr. Carles Rua) and Columbia University (Prof. Venkat Venkatasubramania). PROSAFE aims to bring together a critical mass of partners with interdisciplinary expertise and competencies to undertake original research and train next-generation engineers able to combine machine learning, artificial intelligence, and process

systems engineering with domain knowledge of process industry and process safety, to significantly improve safety and productivity in high hazard industries.

Signed: Eulàlia Planas

University of Queensland

UQFire welcomes new PhD Students

Josh Madden is a new PhD Student studying the Phenomena Governing the Fire Dynamics in Open-Plan Timber Compartments. Prior to starting his research, he worked in the fire engineering industry for over six years on a wide range of projects including airports, prisons, stadia, and casinos. The main goal of his research is to provide industry with a greater understanding of how to design mass timber buildings with respect to fire. In his free time, Josh enjoys learning Spanish, traveling to exotic destinations, and watching sports.



Ayyappa Thejus Mohan is a new PhD student exploring *holistic fire engineering design*. Prior to UQ, Ayyappa completed the International Master of Science in Fire Safety Engineering (IMFSE) and then worked in the fire engineering industry developing fire safety strategies for a variety of building projects. His current research aims to understand the issues of fire engineering practice and develop a holistic approach to fire engineering designs in the built environment. When he's not busy with research, Ayyappa likes to play music, draw, and go on scenic hikes.

Visiting researchers

Nan Zhuojun spent several months visiting UQ Fire as a visiting PhD student from the Hong Kong Polytechnic University. Her work includes complex 3D structural modelling using OpenSees for fire as well as full-scale experimental work on open plan compartment fire dynamics. While she was here, Zhoujun spent her time at UQ collaborating with the UQFire team on scale testing and exploring the distribution of heat flux in open plan compartments. It was a pleasure having Zhoujun here, and we look forward to seeing the results of her work published in the near future.



Dravesh is a PhD student from the Indian Institute of Technology at Gandhinagar (IITGN) in India, and is joining UQFire for a few months as an Exchange Student. At UQ, Dravesh will focus on *investigating the effects of lithium-ion battery fires*. Besides exploring the fire safety of Li-Ion batteries, Dravesh plans to spend his time in Brisbane at wildlife sanctuaries observing koalas.

New staff

Anwar Orabi joined UQFire in mid-2023 as a lecturer in Fire Safety Engineering. His background is in Structural Fire Engineering, including numerical simulation for performance-based engineering, large-scale analysis of structures in fire, and application of AI and data science for real-time risk mitigation. At UQFire, Anwar will continue to develop tools for structural fire engineering and explore timber and HPC research along with the rest of the team.



Hons K. Wyn a recent UQFire PhD graduate, returned to the team as a Postdoctoral Fellow in Fire Safety Engineering. His background includes Smouldering Combustion, Gasification, Biofuels, and Renewable Energy. Hons did his PhD research on fuel gas production via self-sustaining smouldering combustion of biomass. Outside of research, Hons' passion includes music and plays guitar, bass, and drums in a wide range of genres including Metal, Prog, and KPop.

Sergio Zarate, another UQFire graduate returned, this time, to manage the lab he once worked in as a PhD candidate. Sergio's background is experimental analysis of fire spread, for which he designed and built bespoke experimental setups. He also worked for UQFire over a year as a research officer primarily focused on consultancy. In his role as lab manager, Sergio now supports the entire UQFire team while carrying out his own research, and teaching students in the Master's programme.



Recent graduates

Four outstanding PhD students specialised in fire research graduated from UQ in 2023. UQFire extends their warmest congratulations to Dr. Abdulrahman Zaben, Dr. Ian Pope, Dr. Sergio Zarate, and Dr. Hons K. Wyn.

Hybrid Glulam-FRP beam with improved fire performance

Abdulrahman Zaben, supervised by Cristian Maluk

Solid-phase temperature analysis and correction for multi-scale fire experimentation

Ian Pope, supervised by Juan Hidalgo and Felix Wiesner

Contribution of convection and radiation at the preheating stage during fire spread in fuel beds

Sergio Zarate, supervised by Juan Hidalgo and Andres Osorio

Fuel-gas production via self-sustaining smouldering of biomass

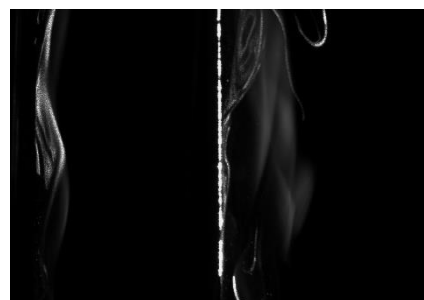
Hons K. Wyn, supervised by Luis Yermán



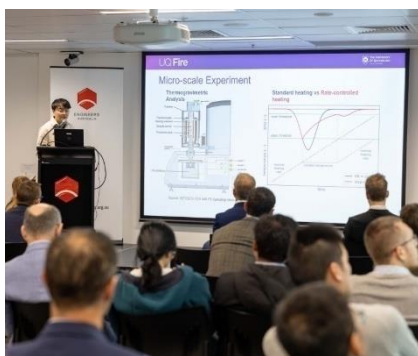
UQFire around the world

15th International Symposium on Particle Image Velocimetry

The work of UQFire PhD student Waseem Hittini was presented at ISPIV2023 in San Diego, California. In his research, Waseem developed a novel composite impregnated with seeding particles. This allows UQFire to visualise and measure the velocity fields in the vicinity of the material surface. This can be used to gain a greater understanding of the reactive boundary layer, which enables the assessment of wall functions and coefficient of convective heat transfer sub-models for reactive flow.



SFS and SFPE Joint International Conference on Holistic Fire Safety Design



UQFire PhD student and 2022 Society of Fire Safety (SFS) research grant recipient Wenxuan Wu presented at the SFS & SFPE Conference in Brisbane. With the grant, Wenxuan procured the Super-Res® add-on for NETZSCH STA 449 F3 Jupiter® at UQ Fire Lab, complementing the team's thermogravimetric analysis capabilities. This allows for adaptive adjustments to the heating rate based on a sample's mass change, effectively separating overlapping processes during measurements. While the primary focus of this research lies in understanding the thermal decomposition kinetics of timber products, particularly solid-phase oxidation, this asset also prepares the fire safety community to tackle future challenges with complex materials.

Dr David Lange delivered a keynote presentation during the conference, titled "Defining the outcome of Fire Safety Engineering Education: a necessary first step in defining curricula", and followed up with a second presentation during the conference titled "The fire safety strategy as the outcome of the design process". These presentations presented a case for a shift in how fire safety engineering functions for the built environment and were another piece of a growing body of work that UQ Fire has contributed to on the nature of fire safety engineering education and the development and future direction of the profession.

13th World Conference on Timber Engineering in Oslo

Wenxuan Wu presented his research on self-sustained smouldering - an exothermic solid-phase oxidation process of porous char - at the 13th World Conference on Timber Engineering in Oslo, Norway. The smouldering process can damage or destroy timber structures long after a fire has burnt out or its flame front has passed. The relationship between the occurrence of self-sustained smouldering and the properties of different timber species was determined through bench-scale smouldering tests using Cone Calorimeter and TGA using nine Australian timber species. The main outcome of this research shows less dense timbers with lower activation energies were more prone to initiate and sustain smouldering under extreme laboratory conditions.





Institution of Fire Engineers (Australia) National Conference

Dr David Lange presented an update on ongoing work at UQ to characterise the consequences of battery fires in the built environment. This was presented as part of a session on New energy technology fire safety risks, with representatives from Fire and Rescue New South Wales, Tesla, Warringtonfire, the ABCB, SiTP in Olsztyn also presenting and participating in a panel discussion afterwards. David's presentation was a summary of work being done by the group on the development and commissioning of a novel battery fire testing apparatus.

Photo credit: The Institution of Fire Engineers Australia

See you at the 2023 IAFSS symposium

Many of the research students and most of the UQFire staff will be presenting during the upcoming IAFSS symposium in Japan. We look forward to meeting all of you!

Signed: Anwar Orabi

University of Science and Technology of China (State Key Lab of Fire Science)

Professor Jinhua Sun Named Fellow of The Combustion Institute

Renowned scholar Professor Jinhua Sun from our laboratory has been elected as a Fellow of the Combustion Institute for 2023, marking him as one of three scholars from China to achieve this prestigious honour among the 15 global awardees.



With a distinguished career as a Chair Professor at the University of Science and Technology of China (USTC) since his introduction to the country in 2002, Professor Sun has actively contributed to the fields of combustion and fire science both domestically and internationally. His pivotal roles in various national and international committees, including his position as the Vice Chairman of the USTC Fire Laboratory's Academic Sub-Committee, exemplify his dedication to advancing fire safety measures across industries. His contributions have not only advanced the understanding of fire dynamics but have also found practical applications in prominent national and international institutions and companies.

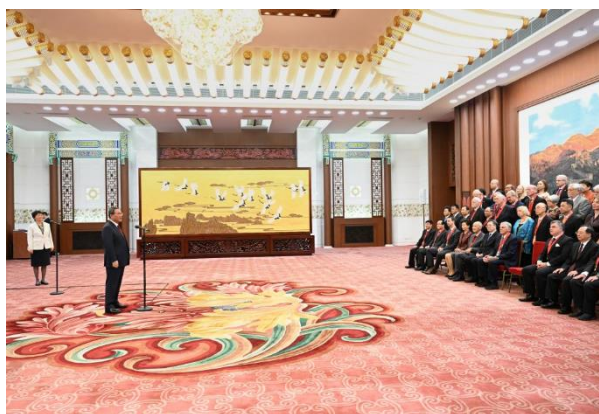
Professor Sun's groundbreaking research in innovative energy, industrial and architectural fire safety, particularly in the realm of lithium-ion battery and hydrogen fire safety, has resulted in the publication of over 360 SCI papers in esteemed publications such as PECS, CNF, PCI, and FSJ, and has garnered more than 12,000 citations. Notably, more than 50 of his papers have been featured in journals with impact factors exceeding 10. His extensive contributions include authoring eight academic books and being involved in five national and group standards. He has been invited to speak at 40 international and domestic academic conferences, including the International Conference on Fire Safety Science and the International Symposium on Industrial Safety and Protection.

Recognised with over 20 national and international awards, including the recent acknowledgement by the Combustion Institute for his outstanding contributions to fundamental research in building and new energy fire combustion and flame dynamics, Professor Jinhua Sun continues to be a leading figure in international combustion, energy, and fire safety. Established in 1954, the Combustion Institute remains a pinnacle academic organisation in the field of global combustion, and the title of Fellow represents a lifelong honour celebrating exceptional contributions to the field.

Dr. Koyu Satoh won the Chinese Government Friendship Award

On September 28th, 2023, Premier Li Qiang of the State Council met with representatives of foreign experts receiving the Chinese Government Friendship Award for Outstanding Foreign Experts at the Great Hall of the People. Dr. Koyu Satoh was invited to attend the meeting.

Li Qiang thanked foreign experts for their outstanding contribution to promoting China's scientific and technological progress, personnel training, and modernization. He said that the world today, fraught with conflicts and disputes, is void of friendship and cooperation, and peace and development. Li Qiang said that foreign experts have come to China from afar to promote exchanges, strengthen cooperation, and spread friendship with their concrete actions, and this is particularly valuable in a world full of changes and chaos.



Li Qiang pointed out that China is now advancing Chinese modernization across the board with high-quality development, and leading the overall population of more than 1.4 billion into modernization, which is an unprecedented great cause and will release massive development opportunities and provide a broad stage for business and entrepreneurship. An open China welcomes high-caliber personnel from around the world. Li Qiang expressed his expectations that foreign experts will continue to be deeply engaged in China's development. The Chinese government will continue to optimize relevant policies, take concrete actions to safeguard foreign experts' legitimate rights and interests, and strive to create a better working and living environment for them.

The Ministry of Human Resources and Social Security (State Administration of Foreign Experts Affairs) hosted the Chinese Government Friendship Award Ceremony on September 27th. The minister, Xiaoping Wang, presented the awards to the receivers and delivered remarks. Dr. Koyu Satoh presented the Award Ceremony, as a foreign expert of the University of Science and Technology of China (USTC).



Dr. Koyu Satoh has made a significant contribution to basic scientific research of forest fires. He had been working at USTC for more than 10 years. He is now a foreign expert at the State Key Laboratory of Fire Science (SKLFS) of USTC. He has dedicated his profession to the construction of the Peaceful China Initiative for a long time, especially in terms of large-scale fire research in Chinese fire safety technology. Due to his outstanding contribution to Chinese education and scientific development, he was also awarded the 15th Huangshan Friendship Award of Anhui Province.

The Chinese Government Friendship Award is the highest award for foreign experts who have made outstanding contributions to China's socialist modernization as well as exchanges and cooperation with other countries. In recent 4 years, there have been 3 foreign experts from USTC receiving the Chinese Government Friendship Award, including Dr. Koyu Satoh (2022), Prof. Bjoren Nashan (2019), and Prof. Anton Zeilinger (2020).

Review article regarding pool fires dynamics published in *Progress in Energy and Combustion Science* from the SKLFS

At the invitation of the internationally renowned journal "*Progress in Energy and Combustion Science*", Prof. Longhua Hu and Associate Prof. Jun Fang from the State Key Laboratory of Fire Science recently published a long review paper titled "Pool fire dynamics: Principles, models and recent advances". This review combines the research outcomes of these two researchers on pool fires over the past fifteen years, as well as some important international research breakthroughs in the two decades. Basic theoretical models and new progress of pool fire dynamics were comprehensively summarized, including the scale effect, the wind effect, pressure and gravity effects, and multi-pool fire dynamics. As the fundamentals of pool fires, the theoretical progress made with regard to burning rates, air entrainment, flame pulsation, the morphological characteristics of flames, radiation, and the dimensional modelling are reviewed first, followed by new insights into the fluid mechanics involved, radiative heat transfer and combustion modelling. Furthermore, new challenges and future prospects for pool fire research were proposed.



In the past fifteen years, Prof. Hu and Associate Prof. Fang's research teams have dedicated to the researches of fundamental behaviours of pool fire dynamics. Over thirty related papers have been published in *Combustion and Flame*, *Proceedings of the Combustion Institute*, and *Fire Safety Journal*. Prof. Hu was also invited to deliver plenary lecture at the 12th International Symposium on the Fire Safety Science (2017, IAFSS) and the 8th International Seminar on Fire and Explosion Hazards (2016, ISFEH). (Paper link: <https://doi.org/10.1016/j.pecs.2022.101070>)

Katharina Kohse-Höinghaus was appointed as Honorary Professor of USTC



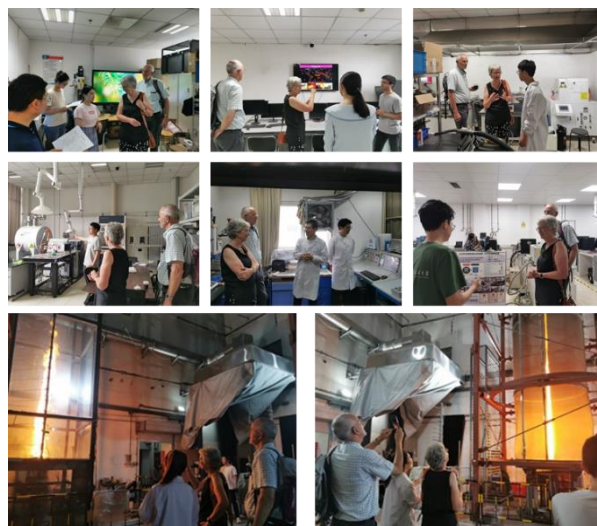
USTC Honorary Professor Awarding Ceremony for Prof. Katharina Kohse-Höinghaus

Katharina Kohse-Höinghaus, member of German National Academies of Sciences and Chinese Academy of Sciences (CAS), past president of the Combustion Institute, and international distinguished scholar of the FIPI program of CAS, was appointed as Honorary Professor of University of Science and Technology of China (USTC) on July 11, 2023. Prof. Naian Liu, director of the State Key Laboratory of Fire Science, presided over the appointment ceremony, and Prof. Gequn Shu presented the Honorary Professor certificate to Prof. Katharina Kohse-Höinghaus. The appointment of Prof. Katharina Kohse-Höinghaus as Honorary Professor of USTC will further promote exchange and cooperation in the field of fire science.

Prof. Katharina Kohse-Höinghaus expressed her great honor and pride in being appointed as Honorary Professor of USTC, shared her cooperation experience with USTC in the past 10 years, and gave a lecture entitled *Combustion Chemistry and Diagnostics for The Future*. The seminar adopted a combination of online and offline mode, and more than 2,900 audiences watched the live broadcast. The presentation focused on international energy sustainability and how to carry out combustion research in the context of carbon neutrality. In the seminar, Prof. Katharina Kohse-Höinghaus presented the advancement of diagnostic methods for combustion chemistry reactions, and the corresponding results on the analysis of combustion processes using in-situ diagnostic techniques. She highlighted that fundamental combustion chemistry research is of great value for the prevention, detection as well as mechanistic studies of large-scale fires, for the carbon reduction of future energy, and for the development of a sustainable world.

Prof. Katharina Kohse-Höinghaus visited the State Key Laboratory of Fire Science

During the visit in USTC, Prof. Katharina Kohse-Höinghaus visited the Aircraft Fire Prevention Laboratory, the Forest Fire Satellite Remote Sensing Experimental Bench, the Lithium-ion Battery Fire Prevention Test Bench, the Fourier Transform Ion Cyclotron Resonance Mass Spectrometer Laboratory, the Lightning Fire Experiment System and the Fire Chemistry Laboratory. She listened to the introduction of those experimental benches, and watched the demonstration experiments of fire whirl.



Prof. Katharina Kohse-Höinghaus with members of the Women in Combustion workshop



On July 14, 2023, the Women in Combustion workshop was held at Anhui Gaosu New Century International Hotel, Hefei. The workshop was organized by the State Key Laboratory of Fire Science of USTC and co-organized by the Women's Committee of the Combustion Committee of the Chinese Society of Engineering Thermophysics (CSETP) and the Alliance of One Belt and One Road National Scientific Organizations (ANSO), with Prof. Zhandong Wang as the executive Chairman.

More than 50 female combustion scholars and students from 25 universities and institutions of CAS, including 11 international students from USTC, attended the workshop. Prof. Katharina Kohse-Höinghaus gave a plenary talk on *Pathways in Combustion*, which centered on her personal research experience, research progress in energy and combustion, etc. She shared her personal experience and experience in scientific research with young female combustion scholars, and enlightened them the academic career planning and development strategies. Prof. Haiping Yang from Huazhong University of Science and Technology (HUST), Associate Prof. Yi Gao from Shanghai Jiaotong University (SJTU), Prof. Ying Li from Institute of Atmospheric Physics (IAP) of CAS, Prof. Guannan Liu from Nanjing University of Science and Technology (NUST), and Associate Prof. Meirong Zeng from SJTU gave the invited talk and shared their work and research experience. The workshop aimed to provide guidance for young

female researchers on academic career planning and development through seminars, topic reviews, and experience exchanges.

Bio of Prof. Katharina Kohse-Höinghaus



Katharina Kohse-Höinghaus, a Senior Professor of Physical Chemistry at Bielefeld University, Germany. She is internationally known for her research in combustion chemistry and diagnostics and has been honored with prestigious awards, professorships, and lectureships. Among others, she has received the *German Cross of the Order of Merit*, the *Giulio Natta Medal in Chemical Engineering of the Politecnico di Milano*, the *Alfred C. Egerton Gold Medal of the Combustion Institute*, the *Walther Nernst Medal of the Bunsen Society*, and three highest awards for international scientific cooperation issued by the Chinese Academy of Sciences (CAS) and the People's Republic of China. CAS has also awarded her a Distinguished Scientist President's International Fellowship in 2022. Professor Kohse is a member of six academies, including the German National Academies of Sciences and of Engineering as well as the European and the Chinese Academy of Sciences. She has served in numerous functions in professional societies and academic organizations, including the German Council of Sciences and the Humanities, the International Advisory Board of the Alexander von Humboldt Foundation, and the Senates of the German Research Foundation and of the Helmholtz Association of National Laboratories. She was the president of the Bunsen Society of Physical Chemistry and of the Combustion Institute and has served as editor-in-chief of Combustion and Flame. She is also a dedicated teacher with more than 100 theses supervised and pioneered hands-on school lab activities in the STEM disciplines.

Young Investigator Award of 13th Asia-Pacific Conference on Combustion

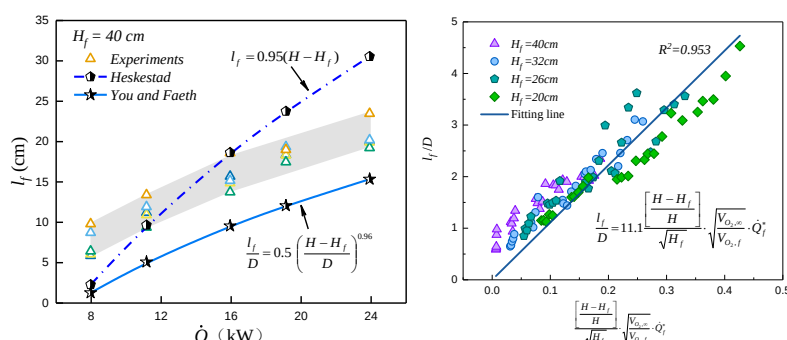


Figure 1 Comparison with equations proposed in previous studies and this study.

entitled "Flame extension length of ceiling jet driven by strong fire volume in a closed utility tunnel" in the ASPACC 2021. For a fire accident in a utility tunnel, the ceiling jet driven by strong fire plume is the most typical fire behavior, which has not yet been fully explored in such an enclosed space. Therefore, Liu et al. performed a series of experimental studies on the fire dynamics inside a reduced-scale utility tunnel (1:8). The mechanism under the effects of environmental conditions and structural boundaries has been revealed through experiments and theoretical analysis, and a prediction model coupled with the characteristics of the fire source and environmental conditions has been proposed.

In addition, due to the continuous changes in environmental conditions, a unique combustion phenomenon - ghosting flame - has been observed under a non-stationary boundary condition inside a utility tunnel. Recently, we have conducted extensive research on the critical conditions of this phenomenon. The formation process of ghosting flame under environmental constraints is clarified and the critical conditions are determined. In the future, more experiments will be conducted to explore the critical conditions and mechanism of this special phenomenon.

Multiple-channel Satellite microwave measurements in vegetation fires study

Vegetation fires are common phenomena across the world. Globally, fires burn a total of ~350 million hectares/year of vegetated areas, approximately the size of India, and release tremendous emissions into

On May 23, 2023, the Committee of the 13th Asia-Pacific Conference on Combustion (ASPACC 2021) announced the list of winners of the "Young Investigator Award". Hong Liu, a PhD student from Prof. Lizhong Yang's group in our laboratory, was awarded.

Mr. Liu gave an oral presentation

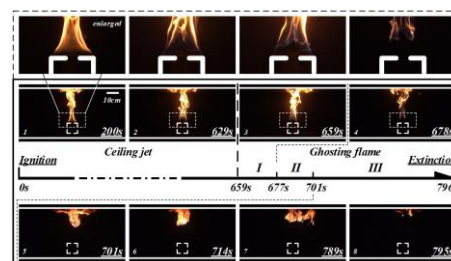


Figure 2 Evolution of ghosting flame and critical oxygen concentration of ghosting flame.

atmosphere, which greatly affect terrestrial ecosystems, climate, human health, and the economy. Effectively assessing fire danger is critical to mitigate the associated negative effects of fires, which is especially important under global warming with impressive extreme fire events in recent years such as the 2019 Amazon rainforest wildfires, Australian 2019/2020 Black Summer bushfires, and the Hawaii Firestorm in early August in 2023. The state-of-the-art satellite microwave technology provides the unique opportunity to monitor vegetation vertical structure and vegetation water content (VWC) status of different vegetation strata, which is a critical information for fire risk. However, associated investigation in fire domain is rare.

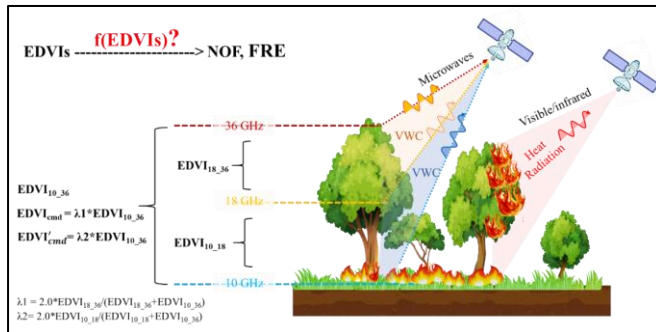


Figure 1. Schematic diagram of the multiple-channel EDVIs in monitoring VWC of different vegetation layers, and potential effect on fires.

the top Earth-science journal of *ISPRS Journal of Photogrammetry and Remote Sensing* (Impact factor=12.7).

Results show that the monthly variations of NOF and FRE in mainland Southeast Asia non-linearly decrease with the EDVI of single vegetation layer, and associated explained variances (indicated by R^2) vary between 40–60%, which further improve to 60–70% by incorporating EDVIs of two different vegetation layers. Compared to the widely-used fire weather indices (FFMC, DMC, DC, BUI, ISI, FWI, and DSR), EDVI provides generally lower but more or less new explanation for NOF and FRE, and the explained variances was found to improve from 45–85% using fire weather indices alone to 72–90% by their combination with EDVI. Especially, the combinations of fire

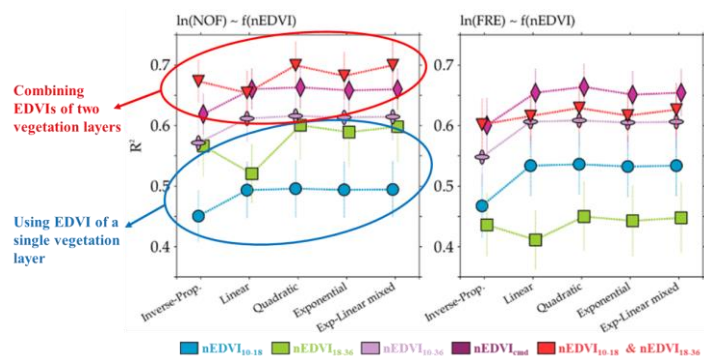


Figure 2. Mean R^2 for the different models examined between the monthly mean NOF (and FRE) and EDVI, with vertical bars indicating the standard deviations.

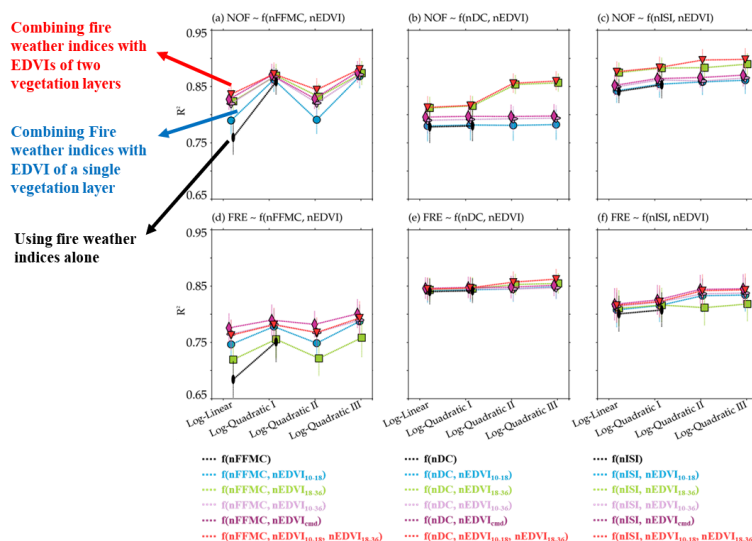


Figure 3. Mean R^2 for the examined regression models of monthly mean NOF and FRE by using fire weather indices (FFMC, DC, ISI) and EDVI as explanatory variables. The vertical bars indicate standard deviations. Results for the combinations of other four fire weather indices DMC, BUI, FWI, DSR with EDVI can be found in the supplementary material in the research article.

weather indices with EDVIs of two vegetation layers provides almost the highest explanation for fires. In addition, the log-linear and/or log-quadratic models are identified to outperform other models examined in depicting the fire-EDVI and fire-fire weather indices relationships; and models that have incorporated both kinds of indices generally perform best in explaining and modelling the temporal variations of NOF and FRE. These findings reveal the differentiated VWC effects on NOF and FRE among vegetation strata and quantify the strong nonlinear response of fires to VWC and weather conditions in mainland Southeast Asia, which could provide new insight for fire danger assessments with the utility of microwave observations.

The work was supported by National Key Research and Development Program of China, the National Natural Science Foundation of China (NSFC), the Fundamental Research Funds for the Central Universities, and the support from the Jiangsu Provincial 2011 Program (Collaborative Innovation Center of Climate Change).

Update from SFPE Hefei Student Chapter

The SFPE Hefei Student Chapter won the Gold Award for Chapter Excellence



On July 1, 2023, the International Society of Fire Protection Engineers announced on their official platform that the SFPE Hefei Student Chapter emerged as an outstanding contender among the 122 chapters worldwide, earning the prestigious Gold Award for Chapter Excellence in 2023. This accolade is bestowed upon the most exceptional chapters within the realm of fire safety, representing a distinguished accomplishment in a global context.

In this year's competition, a total of 53 chapters were recognised, with 19 of them attaining the coveted Gold Awards. Notably, the Hefei Student Chapter clinched the Gold Award for the very first time since its establishment in 2021. The Hefei Student Chapter has been collaboratively engaged with many international institutions, aiming to foster connections and knowledge exchange among students and researchers in the field of fire safety. Their aim is to construct a high-quality platform that facilitates direct communication between undergraduate and graduate students in Anhui, as well as distinguished international engineers and scientists, fostering a robust network for the advancement of fire safety expertise.

Xiaoqing Li won the SFPE Student Funding

Xiaoqing Li, a Master's student from the State Key Laboratory of Fire Science (SKLFS) at the University of Science and Technology of China (USTC), supervised by Professor Yu Wang, has won the prestigious Student Research Grant from the Society of Fire Protection Engineers (SFPE). This grant, established by the SFPE Foundation, is designed to foster and support budding fire engineers in their pursuit of research within the realm of fire science. In the year 2022, only eight individuals worldwide were granted this prize.



In recognition of her potential, SFPE will be providing Xiaoqing with a grant of US\$5,000 to facilitate her independent research efforts in the field of *Thermal breakage and fallout of the tempered glazing system and its interaction with compartment fire*. Notably, she is the first student from USTC to claim this illustrious award, marking a significant milestone in her academic journey.

Professor Kuang-Chung Tsai and Professor Chia Lung Wu visited USTC in July 2023



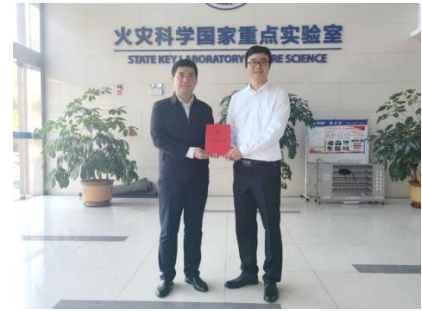
On the 27th of July, the University of Science and Technology of China (USTC) had the honour of hosting a notable academic exchange with Professor Kuang-Chung Tsai and Professor Chia-Lung (Farian) and their PhD students at the State Key Laboratory of Fire Science (SKLFS). During this occasion, Professor Tsai's research group has actively pursued enlightening presentations. These engaging discussions stimulated profound thought among the students, fostering an environment of curiosity and intellectual

exploration. Following the presentations, numerous students actively engaged in a lively question-and-answer session, further exchanging their research ideas with Professor Tsai.

Subsequently, accompanied by Professor Yu Wang, Professor Kuang-Chung Tsai, Professor Chia-Lung (Farian), and their respective team members had the opportunity to visit USTC's laboratory facilities and campus. This visit not only deepened the bonds of friendship but also paved the way for potential collaborations between the two esteemed institutions. It is worth noting that Professor Chia Lung Wu has recently been granted the Chinese Academy of Sciences Taiwan Young Talent Programme (Host by Prof Yu Wang), an award bestowed upon only ten individuals annually, underscoring his outstanding contributions and expertise.

Prof Yu Wang won Youth May Fourth Medal (Anhui Province)

On May 4, 2023, our faculty advisor Professor Yu Wang was awarded the "Anhui Youth May Fourth Medal." Out of 20 exceptional individuals, Professor Wang Yu was the only one from academia selected for this prestigious recognition. The Anhui Youth May Fourth Medal represents the highest honour bestowed upon outstanding youth in Anhui Province. Those recognized as individuals and collectives serve as shining examples and exceptional representatives of the young generation in the province's new era. They have exhibited exceptional accomplishments in their respective roles, setting a high standard for the young people in the province to emulate. The above picture shows Anhui province government leader came to Yu's office and our lab to deliver the award in person on May 4, 2023.



Signed: Naian Liu

University of Sheffield

New arrivals

In March 2023, Dr Ankit Agrawal joined the Structural Fire Engineering research group at the University of Sheffield as part of his Industrial Postdoc with the industrial partner, Danish Institute of Fire & Security Technology. The project, funded by the Danish Innovation Fund, is entitled "*Experimental and modelling investigations of hybrid steel-timber construction details in fire*" and is also supported by Stora Enso. The project includes both experimental and numerical work, and will eventually lead up to developing guidance and models for designers to enable the safe usage of CLT (cross laminated timber) floors in steel-framed buildings. This project will focus more on the thermal part of the problem, and will synergise with Aatish Jeebodh's ongoing PhD numerical modelling project on the mechanical response of steel-hybrid structures.

Projects

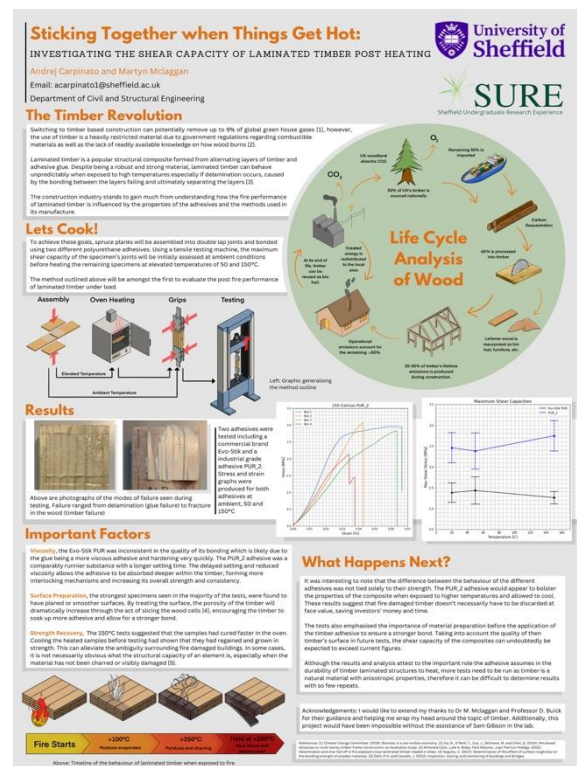
At the end of his second year as an MEng student in Structural Engineering & Architecture, Andrej Carpinato embarked on an engaging six-week summer research internship. His project, titled "*Exploring the Strength of Heated Laminated Timber*", involved manufacturing laminated timber samples using two different types of polyurethane-based adhesives and various cross-sectional areas. He then conducted double strap shear tests to measure the shear capacity of these specimens.

These tests were carried out at room temperature and on specimens which had been exposed to elevated temperatures of 50 and 150 °C. The results were interesting in that the increased temperature showed an increase in shear strength especially when using the high-performance adhesive. The results were however heavily dependent on the surface preparation method of the specimens,

This experience provided Andrej with valuable insights into the world of research, offering him an immersive environment to learn more about engineered timber's behaviour under fire conditions. Andrej will be able to apply some of his learnings as he continues on into his third year.

The figure shows Andrej's poster that will be presented as part of the summer internship showcase at the University of Sheffield (where he has opted for a slightly more engaged project title!).

Signed: Martyn McLaggan, University of Sheffield.

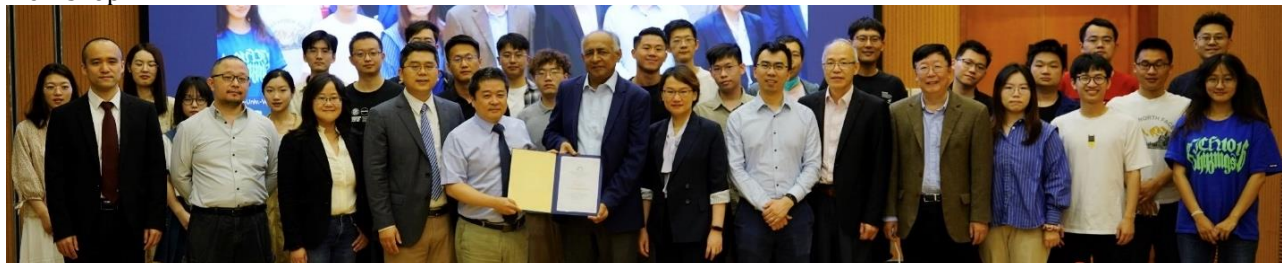


The Hong Kong Polytechnic University

Positions and personnel

Prof. Asif Usmani's Distinguished Visiting Professorship at Tsinghua and SureFire Workshop

On 22 May 2023, the [appointment ceremony](#) for Prof. Asif Sohail Usmani as a Distinguished Visiting Professor was held in the New Civil Engineering Building at Tsinghua University. The ceremony was presided over by Prof. Xinzheng Lu, and the Vice Dean of the School of Civil Engineering, Prof. Kefei Li, presented the appointment letter to Prof. Usmani. After the ceremony, the **Tsinghua-PolyU Smart Firefighting Workshop** was held. The **SureFire** research team, Prof. Asif Usmani, Dr Xinyan Huang, and 10+ PhD students had co-organized and presented at the workshop.



Dr Xinyan Huang has been promoted to Associate Professor and gained new fundings



Dr Xinyan Huang has been promoted to Associate Professor on July 2023. His research project entitled "Smouldering Wildfire" has been awarded the Excellent Young Scientist Fund (Hong Kong and Macau) by the National Natural Science Foundation of China (NSFC). Another project entitled "A Fundamental Study on the Critical Oxygen Supply of the Persistent Deep-Layer Smouldering Peat Fires" gained financial support by the Hong Kong Research Council. These new projects will not only provide scientific guidelines to help reduce carbon emissions from smouldering wildfires but also help reduce the hazards of wildfires and fight against global climate change.

Dr Liming Jiang has received new GRF funding

Dr Liming Jiang's research project entitled "Development of fire-safe floor slab solutions for modern and future timber-integrated buildings using mixed timber composite sections" was awarded General Research Fund (GRF) from the Hong Kong Research Council. Based on various tests, the project will develop CFD and OpenSees models for heat transfer, and thermo-mechanical behaviour will be extensively validated to form an open-source simulation platform. The performance-based design framework following parametric case studies will be established to obtain slab designs fulfilling the key performance goals



Recent Graduates



Dr Yuying Chen was awarded her PhD degree on Aug 2023 with a thesis titled "Smouldering Fuel Processing, Emission Flammability, and Carbon Footprint". She proposed a novel combustion method for biowaste removal that uses a self-sustained flame co-existing with smouldering to clean the toxic smouldering emissions. The critical conditions for the co-existence of smouldering and flaming were investigated. The proposed combustion method was thoroughly evaluated from removal efficiency, by-product value, and carbon footprint, and demonstrated promising application prospects. The content of her thesis is now published in four journal papers in Combustion Science and Technology, Journal of Cleaner Production, Fuel Processing Technology, and Waste Management.

Dr Zilong Wang defended his PhD thesis on Sep 2023, titled "Intelligent Fire Identification and Quantification Driven by Computer Vision". He developed a comprehensive framework for intelligent fire identification and quantification utilizing computer vision techniques. The proposed framework encompasses three primary functions: fire detection, fire segmentation, and fire measurement and calorimetry. He has received SFPE Student Research Grant and published several papers in J. Building Engineering, Proc. Combust. Inst., and Fire Safety J.





Dr. Tianhang Zhang defended his PhD thesis on Sep 2023, titled “Smart Firefighting Framework and Building Fire Forecast Driven by Artificial Intelligence”. He established an AI-driven framework for identification, recognizing, and forecasting the building fire scenario in real-time. The paradigm to adopt deep learning tool to predict the fire HRR, occurrence of flashover and backdraft with multi-modal fire information has been comprehensively investigated. His work has been published in J. Building Engineering, Fire Safety J., and Tunn. Undergr. Space Technol.

New visiting researchers



Prof. Bingyou Jiang joined the PolyU fire research group as a visiting scholar from May 2023. Prof. Jiang received his PhD degree from China University of Mining and Technology and now is a full professor at Anhui University of Science and Technology. He is an expert in industrial dust transmission and prevention and was selected for the China Association for Science and Technology (CAST) Young Talent Nurturing Project and received accolades such as the Sun Yueqi Youth Science and Technology Award. Additionally, he serves a youth editor for the International Journal of Mining Science and Technology.

Prof. Menglong Hao visits the PolyU fire research group from September 2023, funded by Kwang-Hua Education Foundation. Prof. Hao received his PhD degree from Purdue University in 2016 and now is a full professor at Southeast University, China. His research interests include innovative designs, advanced manufacturing techniques, and numerical simulations, primarily focusing on developing thermal management equipment for applications in aerospace, electronics, energy, and various other fields. His key research findings have been published in Science and Nature Energy.



Jakub Bielawski



Dia Luan

From July 2023, two visiting students **Jakub Bielawski** and **Dia Luan** joined in the PolyU fire group for collaborative doctoral research. Jakub is a PhD student from the Building Research Institute (ITB) in Poland, supervised by Prof. Wojciech Wegrzynski. Dia is a PhD student supervised by Prof. Chuangang Fan from Central South University, China. They will conduct innovative tunnel fire research at PolyU supervised by Dr. Xinyan Huang.

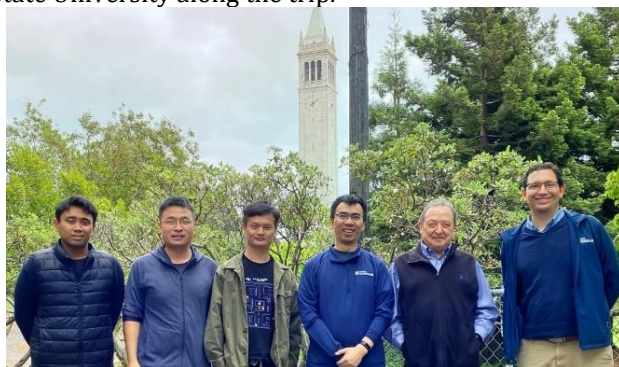
PolyU Fire Lab welcomes new visiting professors and students all year around.

Communications and Conferences

PolyU launched online courses for fire safety engineering After two years of preparation and shooting, the MOOC “[Playing with Fire](#)” is online now. This is the world’s first online course that is dedicated to fire safety engineering. The instructors include Dr Xinyan Huang, Dr Liming Jiang, Dr Gigi Lui, Dr Anwar Orabi, Dr Aatif Khan et al. The course materials (videos and notes) are free to watch, and with an additional US\$ 100, the students can get a certificate.

Dr Xinyan Huang visited UC Berkeley and FM Global in the Summer Sabbatical

Dr Xinyan Huang took his first summer sabbatical leave to the US. He started his summer sabbatical trip from the University of California at Berkeley and visit FM Global to brainstorm new research ideas and establish new research collaborations. Dr Huang also visited NFPA, NIST, UC San Diego, University of Maryland, and San Jose State University along the trip.





Four PhD students attend SFPE EU conference and ITB visiting: Zilong Wang, Tianhang Zhang, Zhuojun Nan, and Xiaoning Zhang, have attended SFPE European conference and presented their latest work. They have also visited Prof. Wojciech Węgrzyński at ITB in Poland. After visiting, they were all exchanging overseas: Zilong at King's College London; Tianhang at the University of Edinburgh, Zhuojun at the University of Queensland, and Xiaoning at Lund University.

Four papers have been accepted by 2023 IAFSS symposium

Four papers from PolyU fire group were accepted for the oral presentation at the 2023 IAFSS Symposium, led by Zilong, Zhuojun, Tianwei, and Wilson. These papers covered topics of smart firefighting, structural fire, travelling fire, and smouldering. In addition, more than 20 posters will be presented at the symposium. We look forward to seeing you at IAFSS conference in Japan!

Student achievements

SFPE HK Student Chapter Won the Gold Medal Again

The SFPE HK Student Chapter was founded in late 2019, and it is the first student chapter in Asia. Since winning the Gold Medal in 2021 and 2022, the chapter has won the Gold Medal again after organising many seminars/webinars and other extra-curriculum events in 2023.



PolyU Junior Researcher Mentoring Programme 2023

Under the guidance of Dr Xinyan Huang and his two PhD students (Meng Wang and Wilson Cheung), a student from West Island School conducted a research project "Smart Firefighting with AI and Robots", and successfully invented an AI robot that could autonomously look for a fire source and extinguish the fire. This project was selected out from in total 50+ projects for media interview.

Ho Yin and Wilson won IFMA Gold Award

PhD students Ho Yin Wong and Wilson Cheung received the Gold Trophy in the Asia Pacific Inter-Institutional Competition on Facility Management Project Presentation hosted by International Facility Management Association (IFMA). Their project is "Revolutionary Evacuation and Management System (REMS)". Big Congrats!

Signed: Xinyan Huang



The Slovenian National Building and Civil Engineering Institute

About last summer: Summer Internship!

This summer, the Fire-safe Sustainable Built Environment department ([FRISSE](#)) hosted a total of 5 international interns who joined our team from [Polytech Angers \(France\)](#), [Simon Bodin](#), and the [International Masters of Science in Fire Safety Engineering \(IMFSE\)](#), [Ashwant Singh](#), [Farith Hinojosa Coca](#), [Maria Binte Mannan](#), [Matheus Pontes Lima](#).

During their time at ZAG, the interns got the chance to collaborate very closely with industry, interact with different teams, work with different stakeholders, and perform various tasks related to the topic of the ventilated façades. Further, they got the valuable opportunity to visit the R&D facilities of [Knauf Insulation \(KI\)](#) – the sponsor of the IMFSE interns, in Škofja Loka, Slovenia, where they were hosted by [Amaya Osacar](#) (photo to the left).





Ashwant Singh:
"Our investigation into the relationship between open-state cavity barriers and ventilated façades allowed us to comprehend a wide range of building codes and understand the literature gaps. It is a critical and evolving area of research that I am happy to have played a part in."



Farith Hinojosa Coca:
"My three-month summer internship with FRISSBE in Slovenia was an amazing experience... The beautiful landscapes and experiences I had will always stay in my heart". Huge thanks to Grunde Jomaas, Amaya Osacar, FRISSBE, ZAG, and KNAUF Insulation for making this possible."



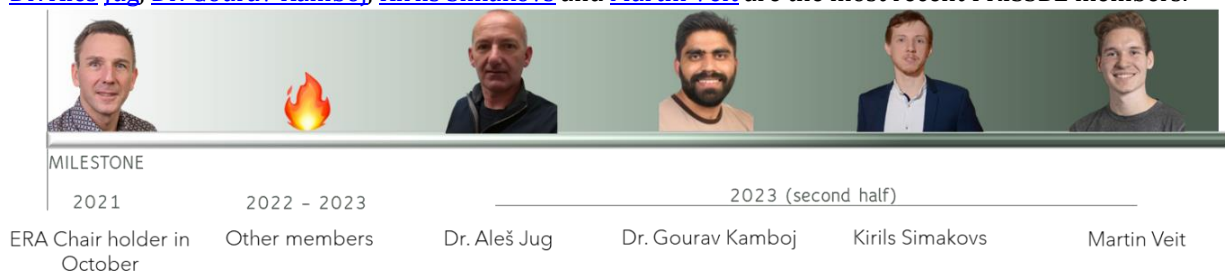
Maria Binte Mannan:
"I feel incredibly fortunate to have completed my first year in the esteemed IMFSE program and to have had the chance to work with the brilliant team at FRISSBE. This internship has been a catalyst for my research-focused journey, exposing me to new facets of fire safety."



Matheus Pontes Lima:
"My internship enabled me to expand my professional network, and it contributed to the acquisition of more knowledge through workshops, seminars, and fruitful, in-depth communications with the ZAG team and KNAUF Insulation representatives."

New members of the FRISSBE team

[Dr. Aleš Jug](#), [Dr. Gourav Kamboj](#), [Kirils Simakovs](#) and [Martin Veit](#) are the most recent FRISSBE members.



[Dr. Aleš Jug](#) joined the team as a professional research associate. His research interest covers the field of fire safety and risk management, plus fire prevention. He brings over twenty years of experience and passion for fire prevention and risk management. Furthermore, he is a qualified and experienced business continuity expert, which makes him valuable to our expert team. Dr. Jug has served as a chair for CTIF Fire Prevention Commission and he is currently the president of the [Slovenian Fire Protection Association \(SZPV\)](#).

[Dr. Gourav Kamboj](#) is the second postdoctoral researcher within the FRISSBE team. He recently graduated with a PhD from the Czech University of Life Science (Prague, Czech Republic) where he was also a researcher for the last 4 years. He worked on a range of research topics, including cellulose nanofiber reinforced adhesives, modification of nanocellulose to make proper dispersion in hydrophobic polymers, cross-laminated timber, nanocomposites, thermally modified wood.

[Kirils Simakovs](#) joined the team as a research assistant. He has a master's degree in chemistry from the Latvian State University (Riga, Latvia). He has several years of work experience and brings expertise from studies of polyurethane foams for insulation applications by performing tests using a variety of test methods, such as the cone calorimeter, Limited Oxygen Index (LOI), Thermo-Gravimetric Analysis (TGA) and heat flow meter.

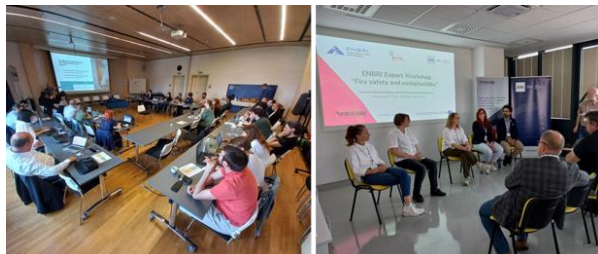
[Martin Veit](#) is a research assistant that is about to enroll as a PhD student. He graduated with a MSc in Indoor Environmental and Energy Engineering from Aalborg University (Aalborg, Denmark). In his thesis, he studied the internal convection in a sustainable loose-fill wood fiber insulation and its effect on the thermal performance of a full-scale wall element. His expertise also includes Building Performance Simulations by using a stochastic modelling approach supported by Machine Learning. The focus of his research is to increase the quality of measurements for fire experiments to support simulations of fire and smoke spread.

Events

Fire takes no vacation #2 “When history burns” and #3 “Engineering methods for fire safety design”. Both the events were organised to transfer knowledge to those who deal with fire safety engineering. The two main guest stars, **Prof. José Torero** and **Prof. Bart Merci**, provided “*fundamentals infused with decades of experience*” according to Prof. Grunde Jomaas.



The **ENBRI Expert Workshop “Fire Safety and Sustainability”** arose from the need to tackle new challenges resulting by incorporating new materials, systems and technologies in the buildings to achieve a sustainable built environment. Presentations by and discussions with researchers from prominent building research institutes such as SINTEF, RISE, Buildwise, ITB related to these fire hazards were hosted at ZAG.



Conference attendance and contribution

In his presentation at **CEI** (Comitato Elettrotecnico Italiano), **Dr. Andrea Lucherini** presented the European-funded FRISBE project and discussed our research on the fire safety of photovoltaic systems.

Dr. Lucherini also attended the World Conference on Timber Engineering (**WCTE2023**) in Oslo (Norway) by presenting his work on “*Predicting the effective char depth in timber elements exposed to natural fires, including the cooling phase*” and the International Congress on Fire Safety & Science (FSS) in Arnhem (Netherlands) by presenting the work on “*Fire Safety aspects of timber structures and tall timber buildings*”. In the same conference in Arnhem, **Dr. Ulises Rojas-Alva** gave a talk entitled “*Is Slovenia prepared for emerging fire hazards due to Lithium-ion battery technology?*”, which presented research that was carried out in collaboration with the Ljubljana Fire Brigade.



Awards

The **ERA Chair holder**, **Prof. Grunde Jomaas** has been honored as a co-recipient (with **Jens Steemann Kristensen** (lead author) and Ben Jacobs) of the **2023 Harry C. Bigglestone Award**. It was presented by the National Fire Protection Association (**NFPA**) and it is given for the exceptional contributions to the field of fire protection concepts and the communication of these. The award-winning paper, entitled “*Experimental Study of the Fire Dynamics in a Semi-enclosure Formed by Photovoltaic (PV) Installations on Flat Roof Constructions,*” is available [here](#).



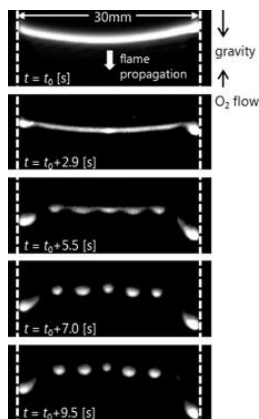
Further, our PhD student **Nik Rus** received the **Student Research Grant** from the **SFPE** (Society of Fire Protection Engineering) Foundation. His project “*FireSafePV Materials*” will study the effects of different types of roofing materials on the critical gap height between the roofing membrane and the PV panel in a building-applied Photovoltaic (BAPV) installation.

Signed: Grunde Jomaas

Toyohashi University of Technology

The fire safety group ECELAB (Energy Conversion Engineering Laboratory) located at Toyohashi University of Technology (TUT), Japan, continues growing. The current main members of the ECELAB include Professor Yuji Nakamura, Associate Professor Tsuneyoshi Matsuoka, Associate Professor Sekishita Nobumasa, Assistant Professor Takuya Yamazaki, three postdoctoral researchers, a secretary, and 26 students.

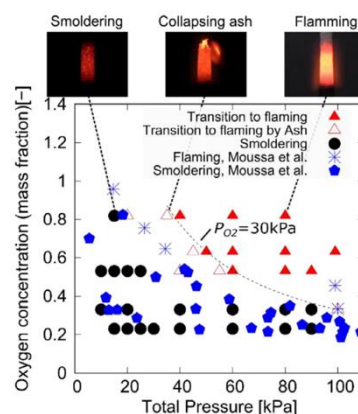
Prof. Yuji Nakamura devoted himself to the study of scale-modeling-based combustion research, to have the right strategy to deal with multi-scale, multi-physics problems, and then establish a better and safer energy system. Congratulations to Prof. Nakamura and his group won the Technical Merit Award (see picture to the right) at the 13th US National Combustion Meeting 2023. Additionally, Prof. Nakamura recently delivered a plenary talk at the AOSFSM5 (AUS) conference and serves as the co-chair of the local organizing committee for the upcoming 14th IAFSS conference to be held in Tsukuba.



Assoc. prof. Matsuoka is dedicated to research on the pattern formation of solid combustion and diagnostics of combustion systems. Utilizing a wind tunnel they developed in-house, which allows for precise control of the flow and reactions of combustion region, they have successfully observed fingering instability. The study of the fingering instability to reveal the whole mechanism which allows us to control unstable behavior. This research has garnered significant attention from many scholars, and we eagerly anticipate the results and contributions of Assoc. prof. Matsuoka!

In figure to the left, flame separated into multiple flamelets, refer to "T. Matsuoka et al., Proc. Combust. Inst., Vol. 36, Issue 2 (2017) 3019-3026".

Asst. Prof. Yamazaki primarily focuses on smoldering of biomass fuel. He has systematically investigated the transition from smoldering to flaming for a thin rod of biomass under varying pressure and oxygen conditions. His research findings hold significant importance for predicting fire growth and have gained recognition and acceptance among many peers in the field. In the figure to the right, classification of the conditions for smoldering and the transition to flaming, refer to "T. Yamazaki et al., Proc. Combust. Inst., Vol. 38, Issue 3 (2021) 5073-5080".



Since the ECELAB started several collaborative research projects, from 2022, three postdocs joined: Dr. Daiki Matsugi (Japan), Dr. Yue Zhang (China), and Dr. Peiyi Sun (China). Additionally, we acknowledge the transition of our former postdoctoral researcher, Dr. Xiaoyu Ju, who has embarked on an exciting new journey as a research professor at the University of Science and Technology of China, China. In the picture to the left, Dr. Sun, Asst. Prof. Yamazaki, Dr. Zhang, and Dr. Matsugi (from left to right).

Dr. Daiki Matsugi's research centers around fundamental studies on burning characteristics of a porous combustible soaked in a liquid oxidizer and "inverse" droplet combustion of liquid oxidizer in a gaseous fuel atmosphere. His research outcomes have already garnered recognition through peer reviews. Congratulations to Dr. Daiki Matsugi for winning JSASS (the Japan Society for Aeronautical and Space Sciences) President award at the 33rd International Symposium on Space Technology and Science and the Best Presentation Award at the 60th Symposium on Combustion (Japanese)!

Congratulations to Dr. Yue Zhang who was selected as a fellow in the Postdoctoral Fellowships for Foreign Researchers Program. Her research is dedicated to the intricate field of fire dynamics, utilizing advanced techniques such as holographic interferometry, Ansys Chemkin-Pro, and Fire Dynamics Simulator (FDS). Dr. Zhang's work enriches the foundational knowledge of flame research and will be instrumental in developing more effective firefighting techniques and ensuring the safety of both responders and the public.

Dr. Sun employed simulation software like FDS and Fluent to create models for multi-scale fire scenarios. Her research not only facilitated the visualization and comprehension of fire-related concepts but also simulated potential accidents or possible situations, enabling the evaluation of safety protocols and emergency response strategies.

ECELAB is a laboratory filled with challenges and opportunities. With a wide range of research interests and a dedicated research team, it will always be the most robust support during your research career. We extend a warm

welcome to doctoral students and postdocs with experience in combustion and fire dynamics to join us in our pursuit of exciting and meaningful research. If you are interested in our lab, please leave your contact information. Thanks!

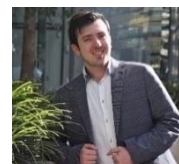
The continued communicating views, news, and achievements in ECELAB blog <https://ece.me.tut.ac.jp/wp/blog/>.

Signed: Zhang Yue

Worcester Polytechnic Institute

New Incoming Members

Fernando Ebensperger is a Ph.D. student working with Prof. Albert Simeoni. He is now working on the study the of ignition properties and firebrand production from a wide variety of vegetative fuels. He holds a Bachelor's and Master's degree in Industrial Engineering from the "Universidad Técnica Federico Santa María". His Master's thesis was on the investigation of ignition delay time for pine needles exposed to a time-decreasing incident heat flux and for pine needles mixed with fire retardants.



Jorge Valdivia is a Ph.D. student working on developing engineering tools for fire exposure analysis of structures at the wildland urban interface (WUI) under the supervision of Professor James Urban and Professor Albert Simeoni. He received his master's degree from Universidad Adolfo Ibáñez in Santiago, Chile.

Pablo Pinto is a Ph.D. student in the Department of Fire Protection Engineering at Worcester Polytechnic Institute (WPI) studying flame spread over polymer fuels under non-steady wind in normal and micro-gravity under the supervision of Professor James Urban. He received his master's degree from Universidad Técnica Federico Santa María in Valparaíso, Chile.



Rayna Harter is a Ph.D. student focused on studying toxic gas exposure to fire fighters in postfire environments under the supervision of Professor James Urban. She completed her bachelor's and master's degree from WPI.

Alana Miska is a M.S. student supervised by Professor James Urban. She completed her bachelor's in chemical engineering from WPI. Her work focuses on studying the flame spread over thermally thin fuels under the influence of unsteady wind.

Xiuqi Xi, PhD is a post-doctoral fellow in Fire Protection Engineering Department at Worcester Polytechnic Institute (WPI) working on several projects including, wildland urban interface (WUI fires). Dr. Xi obtained his Ph.D. from University College London under the supervision of Professor Torero where he obtained Data-driven models of fire at multiple scales.

Graduated Students

Dr. Nate Sauer, Burning Behavior of Fuel on Water Under the Influence of Waves. (Advisor: Prof. Ali S. Rangwala) This work experimentally examines the interaction of waves with burning pools at three distinct sizes: 10 cm, 80 cm, and 2 m. Three wave tanks were used to investigate the burning of floating hydrocarbon fuels. Two of these wave tanks were custom-built at Worcester Polytechnic Institute for this study. The third and largest tank used in this study is located at the US Army Cold Regions Research Facility in Hanover, NH.

<https://digital.wpi.edu/concern/etds/kw52jc30x?locale=en>

Dr. Hsin-Hsiu Ho, Heat Release Rate of Fires Using Point-Based Sampling (Advisor: Prof. Ali S. Rangwala)

Conventional hood-based calorimeters rely on total capture of the combustion products to measure HRR. Because of this requirement, the fire size is often limited to a certain length scale. A new Outdoor Gas Emission Sampling (OGES) system was developed to serve as an alternative to expensive industrial gas sampling equipment to measure the heat release rate (HRR) of large-scale fires in outdoor scenarios. The low cost and lightweight nature of the OGES design introduced the potential of deploying multiple systems simultaneously and a new technique utilizing point-based capture. <https://digitalwpi.wpi.edu/concern/etds/vt150n76k?locale=en>

Research Centre

WPI has been selected to join the National Science Foundation-funded Wildfire Interdisciplinary Research Center (WIRC) a collaboration between universities and industry. The addition of WPI expands the Center's footprint to the east coast of the United States and strengthens its expertise in Fire Protection Engineering and the Wildland-Urban Interface (WUI). WPI will work with its university partner and lead site San Jose State University, led by Prof. Craig Clements, to expand the horizons of wildfire research, foster community resilience, and develop innovative strategies for preventing and managing wildfires.

Visiting faculty

Dr. Kuibin Zhou (Professor, Nanjing Tech University)

In August 2023, Prof. Zhou from Nanjing Tech University, designed and tested a large-scale line fire in both still air and under wind at WPI Lab. The burner size was 240 cm in length by 15 cm in width, and the maximum heat release rate reached 3 MW. The goals of current tests are the further validation for the flame length model of fire line (doi:10.1071/WF21087) and the mechanism of fire whirl induced by fire line (doi: 10.1007/s10694-015-0507-9).



Dr. Hayri Sezer (Assistant Professor, Southern Georgia University)

In July 2023, Dr. Hayri Sezer from Southern Georgia University, developed a mathematical model to predict the smoldering front in sand soaked with liquid hydrocarbons. The model was verified and validated against available literature. A 2D Hybrid LBM-FVM tool was developed to solve complex fire dynamics problems. The platform solves the N-S equations by using Lattice Boltzmann Method and the heat and the mass transfer are solved by using finite volume method. The hybrid platform can be applied to solid fuel combustion and fire dynamics problems that occurred in reactive porous media. Further, the degrading fuel combustion phenomenon can be solved with the hybrid LBM-FVM platform. In addition to the fire aspect, the platform can be applied to determine the convective mass and heat transfer coefficients. Dr. Sezer and Dr. Selvaraj (WPI) are working on improving the numerical model to predict spontaneous ignition in coal stockpiles. The current modeling framework will extend to include the Darcy's flow as well as the buoyancy effect to better predict the species and heat transfer in coal stockpiles. Dr. Sezer's student Shehzad Khan is working with Dr. Reza (WPI) to analyze the flow pattern in live and dead vegetation by an analytical fluid dynamic based model. This work will be extended to predict the drag coefficient and nusselt number correlation for varying flow conditions.

Dr. Pedro Reszka (Professor, Universidad Adolfo Ibañez, Chile)

Dr. Pedro visited the WPI's Department of Fire Protection Engineering to get to know the groundbreaking research on wildfires carried out in the group. The idea was to increase the collaboration between his university and WPI, while giving greater visibility to the research carried out in Chile. During his visit he was actively involved in several projects, which included the California Canyon Experiment, a joint effort between San José State University, Calfire, The University of Melbourne, and WPI to carry out a highly instrumented eruptive fire in a canyon in Salinas, California; and several smaller scale surface fire tests at the US Forest Service's Silas Little Experimental Forest in New Jersey, with the goal of providing information for forensic wildfire investigations. He was also involved in several of the research projects carried out by doctoral students at WPI, whose topics ranged from surface fire spread to fire suppression. Further, he had a chance to interact with professionals from many organizations such as the SFPE, NFPA and FM Global. "This was a unique opportunity, both personally and professionally, and I will be forever grateful to the fire group at WPI" said Dr. Reszka.

Dr. Charles Kahanji (Acting Head/Senior Lecturer in Structural Engineering University of Zambia)

Dr. Charles project involved testing the flammability of two African hardwood species namely the African Padauk and the African Teak using the Fire Propagation Apparatus (FPA). The focus was on the structural fire engineering implications of using these woods. Additionally, the study also sought to develop models to estimate temperature profiles and charring rates of the woods.

Visiting student

Robert Bray, Ph.D. student from Belfast School of Architecture & the Built Environment, Ulster university was awarded Fulbright research scholarship to continue his research in fire science in collaboration with WPI. During his stay he deSigned: a reduced scale compartment to allow for direct measurement of the mass flow into the compartment, without the use of a ventilation parameter, in an environment with a stable and well-defined smoke layer. He also performed experiments using the fire propagation apparatus (FPA) with conditions varied by altering the imposed heat flux and flow rate to a range of fuels. This allowed him to compare correlations of species yields to the equivalence ratio for various fuels on two scales. The aim was first to reproduce the findings of earlier research before expanding on this work using different materials and measurement techniques.



Current Research:

Study of the Reliability of Fire Pattern Indicators used in Wildland Fire Investigation (NIJ grant NIJ-2020-17294) – Field Experiments.

Under the context of this project two series of field experiments were conducted in the Spring of 2022. The first set of experiments was conducted during the seasonal prescribed burns at the Joint Base McGuire-Dix-Lakehurst, in New Jersey, US. The team from WPI led by Prof. Albert Simeoni and Dr. Juan Cuevas counted with the support of USDA Forest Service Researchers and the New Jersey Forest Fire Service. The second set of experiments was conducted at Chelan County, Washington, US. In this opportunity, the team from WPI counted with the support of the USDA Forest Service Researchers, the Lake Wenatchee Fire & Rescue Service, and the Fire Marshal for Chelan Co., Steve Rinaldi. *(Photo: Ph.D. students Weixuan Gong and Navya Muniraj installing heat flux and temperature sensors during fieldwork).*



At these field campaigns, twelve experiments were conducted using hectare-scale burn plots that allowed to characterize the thermal conditions that lead to the generation of micro-scale fire pattern indicators. Partial results and the preliminary analysis of these experiments were presented at the IX International Conference on Forest Fire Research, held in Coimbra, Portugal, in November 2022.

The California Canyon Fire Experiment – Fall 2022

A team of WPI researchers composed of Prof. Albert Simeoni, Visiting Prof. Pedro Reszka, and Dr. Juan Cuevas traveled to California to participate in the conduction of the California Canyon Fire Experiment. The experiment, which aimed to study extreme fire behavior and fast-moving fire spread in steep canyons, was an exceptional collaborative effort led by the Wildfire Interdisciplinary Research Center (WIRC) at San José State University. The experiment included the participation of WPI, The University of Melbourne, and received support from the California Department of Forestry and Fire Protection (CAL FIRE). This collaboration led to an unparalleled study, marking the first time a canyon wildland fire study of this magnitude had been undertaken anywhere in the world. *(Photo: Aftermath of the California Canyon Fire Experiment).*



A Multiscale Study of the Coupling Between Flow, Fire and Vegetation – Influence of Vegetation Distribution and Flow on Fire Behavior and Plume Development for Risk Mitigation in Prescribed Burns (SERDP grant RC20-C3-1362)

Field Experiments (Fall 2022)

The first round of experiments to study the behavior of fire plume in an open field was conducted by the WPI team comprised of Dr. Muthu Kumaran Selvaraj, Dr. Reza Ziazi and Ph.D. student Weixuan Gong. The group was supported by a team of researchers and technicians from the USDA forest service (USFS) and Tall Timbers Research Station (TTRS). The fire plume was generated using pool fires fueled by diesel. The near-field fire and plume behavior was captured using thermocouples and pressure probes. In the far-field, sonic anemometers mounted on towers (30ft high) measured the plume/wind velocity. Cameras (2D and 3D) were used to record the large-scale structures generated by the buoyant plume during its interaction with the atmosphere *(Photo: Diesel pool fire instrumented with sonic anemometers).* A total of seven experiments with varying fire intensity were conducted in this campaign.



Field Experiments (Spring 2023)

The second round of field experiments were conducted in Georgia at the Savannah River Ecology Lab (SREL) to measure the plume characteristics and its interaction with the forest canopy. WPI team comprised of Dr. Muthu Kumaran Selvaraj, Ph.D. students Weixuan Gong, Navya Muniraj, and Sergio (from university of Edinburgh) participated in the campaign. Pool fires arranged in different configurations were used as a fire source. A near-field setup was used to characterize the fire source. A total of 19 sonic anemometers were placed within the forest at different location at heights (upto 40ft) from the fire source to quantify the variation in plume velocity during its interaction with the vegetation. Selected trees near the fire source were also instrumented to measure the flow and heat transfer from fire plumes. High-definition videos were captured near the fire source and above the forest canopy (above 50 ft) to study the changes in plume structure as it interacts with the forest canopy.



Effect of inert Gas Discharge on Wood Crib Fires in Reduced-Scale and Full-Scale Experiments

This research conducted by Jon Zimak (Ph.D. student at WPI), is motivated by the recent changes in the NFPA 2001 standard for testing inert gas discharge systems that protects class A hazards. The standards used to test these systems (UL 2127 and FM 5600) require a 100 cubic meters enclosure to contain the inert gas (nitrogen). The current work involves characterizing the flow within the enclosure at various sections for a discharge time of 60 s and 120 s as well as identifying how these flows affect the test article extinguishment. This characterization will support the design of a reduced-scale enclosure, test article, and the discharge system and will significantly reduce the resource required for laboratory testing. This project is sponsored by Kidde. *(Photo: Burning of test article inside the enclosure)*



Ignition of vegetation from firebrands under external flow

A wind tunnel has been constructed to investigate the criteria governing the ignition of vegetation by firebrands under external flow conditions. This study seeks to replicate real-world ignition scenarios and comprehend the heat transfer process between firebrands and vegetation, thus establishing a fundamental understanding of wildland fire propagation through firebrand ignition. The experiments were carried out by Ph.D. student Luqing Zhu.

Convective Ignition Facility Experiment

A novel experimental setup, employing an air torch capable of generating a flow with temperatures up to 850°C, has been constructed. This apparatus is used to investigate the flammability of various types of vegetation, with particular emphasis on ignition patterns. The goal of this study is to provide a wealth of data and physical mechanisms that will be instrumental in the development of predictive models using FDS/WFDS. The experiments will be carried out by Ph.D. student Jorge Valdivia, while the numerical modeling will be done by post-doctoral fellow Xiuqi Xi. This work is a sub-task from the project which intend to develop Engineering Tools for Exposure Analysis at WUI.

Flame spread over thermally thin materials under unsteady flows

To understand how unsteady flows impact the horizontal and vertical flame propagation over thermally thin materials, two wind tunnels have been designed and constructed. These experiments conducted at normal gravity will be compared with microgravity experiments scheduled for launch in March 2024. The project aims to elucidate the physical mechanisms driving wildland fire spread under unsteady flow conditions from a small-scale level. PhD student Pablo Ponto and MSc student Alana Miska are conducting the experiments.

Novel sensor for detecting compartment fire toxicity

An innovative narrow-band laser absorption sensor capable of measuring concentrations of various species, including HF, HCl, Benzene, among others, is currently under development through collaborative efforts among institutions including WPI, UCLA, and UTSA. This cutting-edge sensor is designed to protect firefighters from these lethal species during overhaul operations. The prototype sensor has already undergone testing during an experimental campaign held between WPI and UCLA in mid-August, utilizing a 1/3 scaled compartment fire setup.

Workshops

A workshop on Explosions and their Characteristics was organized by Professors Chinmay Ghoroi, Gaurav Srivastava, and Ali Rangwala at the Center for Safety Engineering, IIT Gandhinagar, Gujarat, India in the Summer of 2023. <https://safety.iitgn.ac.in/>

A half-day workshop on Industrial Explosion Protection will be given at the Mary Kay O Connor Process Safety Conference, College Station, TX, by Dr. Ali S. Rangwala (WPI) and Dr. Alfonso Ibarreta (Exponent) on Oct 13, 2023. <https://mkosymposium.tamu.edu/>

Publications

A new book named "Explosion Dynamics," Wiley, 2023 by Ali S. Rangwala and Robert G. Zalosh is out in Fall 2023. This book explains the physical and thermochemical phenomena pertinent to deflagrations in an enclosure and provides a mathematical framework for characterizing and applying the answers. Example questions and solutions are offered in each chapter, and there are also brief summaries of how these phenomena influenced what happened in some industrial explosion incidents. Besides serving as a textbook in an academic program, the book is intended to provide guidance to practicing engineers working on various industrial explosion protection applications.

https://www.google.com/books/edition/Explosion_Dynamics/OFrEEAAQBAJ?hl=en&gbpv=1&printsec=frontcover

Awards and Accolades

A research paper by Ph.D. candidate Luqing Zhu's and Prof. Urban examining the thermal interactions between firebrands in firebrand accumulations was recently published in Fire Safety Journal and selected to be the *Editor's Featured Article* for the February 2023 issue. (<https://doi.org/10.1016/j.firesaf.2022.103701>)

Prof. Simeoni has been awarded the Miegunyah Distinguished Visiting Fellowship by the University of Melbourne in Australia. He presented a public lecture, entitled '*Resilience in the face of fire*', at the University of Melbourne's Parkville campus on July 14, 2023. Almost 100 people, including fire scientists, ecologists, engineers, architects, emergency responders, and wildlife managers, attended the lecture. The recording of the lecture is [available here](#). In addition to the lecture, Prof Simeoni was invited by Prof. Penman and Dr. Filkov. To visit the Flare Wildfire Research team located at the Ballarat campus of the University.

Dr. Selvaraj and Prof. Simeoni collaborated with the New York Times (NYT) to investigate the spread of smoke inside a multistorey building in Bronx, New York, which killed 17 people on January 2022. The simulations carried out by WPI researchers closely matched the events observed by the public and apartment residents (and from social media videos) during the accident and successfully explained the smoke movement within the building. The article (<https://www.nytimes.com/interactive/2022/07/08/nyregion/bronx-fire-nyc.html>) has been part of a series of articles on the Bronx fire that have been selected as a finalist of the Pulitzer prize.

<https://www.pulitzer.org/finalists/staff-new-york-times-7#:~:text=For%20its%20urgent%20and%20comprehensive,the%20Bronx%20high%20rise%20home>.

Signed: Selvaraj Muthu Kumaran

CONFERENCES AND MEETINGS

REPORTS FROM CONFERENCES

The 3rd International Lithium Battery Fire Safety Symposium was successfully held in Qingdao

The 3rd International Symposium on Lithium Battery Fire Safety (ISLBFS) was successfully held on August 25-28 in Qingdao. This symposium is jointly hosted by China University of Petroleum(UPC), University of Science and Technology of China(USTC), co-organized by China Energy Storage Alliance(CNESA), The Chemical Industry and Engineering Society of China, University of Surrey of UK, and Shandong University of Science and Technology. The symposium was a success in regards to the quality of the papers and posters presented. More than 350 delegates from 8 countries and more than 80 research institutes gathered together in Qingdao to discuss the fire safety and prospects of lithium battery.



Professor Depeng Kong from UPC, the local organization committee chairman of the Symposium, chaired the opening ceremony of the symposium in the morning of the 26th. Prof. Wenchun Jiang, on behalf of UPC, Prof. Jinhua Sun, on behalf of USTC and the executive vice president Zhenhua Yu, on behalf of the CNESA, delivered speeches in succession.

Professor Ouyang Minggao, the academician of the Chinese Academy of Sciences from Tsinghua University, delivered a plenary lecture titled "Progress in battery safety research at Tsinghua University." Professor Jennifer Wen from the University of Surrey in the UK, Professor Cui Guanglei from the Qingdao Institute of Bioenergy and Bioprocess Technology of the Chinese Academy of Sciences, Dr. Jonna Hynynen from RISE Research Institute in Sweden, and Professor Wang Zhirong from Nanjing Tech University gave plenary lectures on topics such as battery thermal runaway and fire numerical simulations, the mechanism of battery thermal runaway, large-scale experiments on battery thermal runaway, and techniques for preventing and controlling battery thermal runaway. In addition to these 6 plenary lectures, 8 session invited talks, 69 oral presentations, and 43 poster presentations covering topics of lithium battery fire were presented in the following 16 sessions. The selected

papers will be recommended to the Special Issue of Fire Technology and Process Safety and Environmental Protection for peer review.



The award ceremony and closing ceremony were hosted by Associate Professor Ping Ping from UPC. After a vote by conference participants, five outstanding poster were selected, and Professor Wang Qingsong from USTC awarded the recipients. Twelve outstanding oral presentations were selected based on expert evaluations, and they were awarded by Professor Jennifer Wen from the University of Surrey in the UK and Professor Kong Depeng from UPC. During the closing ceremony, Dr. Ping Ping summarized the preparations for the 3rd International Lithium Battery Fire Safety

Symposium and expressed heartfelt thanks to the experts around the world who supported the symposium, and the volunteers who worked diligently for the event. Finally, she looked forward to the future development of lithium battery fire safety and expressed hopes for the promising vision of the fourth ISLBFS, anticipating another gathering with everyone!



UPCOMING CONFERENCES AND MEETINGS

On **November 29-30, 2023** we are going to host the **SFPE Engineering Solutions Symposium on Fire Safety and Sustainable Building Design** in Ljubljana. On December 1st, it will be also possible to visit the fire lab and witness a live fire test. Details are available on our [website](#), on [LinkedIn](#) and on the official [SFPE](#) page, where registration is now open and the full program is available. We look forward to seeing many of you there!



Fire Safety of Facades

The *4th International Symposium on fire safety of facades* will be arranged by RISE and Lund University on June 10-12, 2024. The event will take place on the Lund University campus in the same building as the Division of Fire Safety Engineering. Fire Safety Engineering has been an active research and educational topic for more than 50 years at Lund University. Read more here: <https://www.ri.se/en/fsf>

CALLS FOR PAPERS/ABSTRACTS

4th European Symposium on Fire Safety Science (ESFSS 2024) - Barcelona (Spain) 9th - 11th October 2024

Following the conference held in Nancy (2018), the European Symposium on Fire Safety Science, will be the fourth edition of a series of symposia organized triennially in Europe. Due to the COVID19 situation, the 2021 edition did not taken place. The aim is to gather researchers from and beyond Europe to have exchanges and discussions about fire safety science.



The program will have oral and poster sessions for the presentation of fully peer-reviewed papers over the three days, including invited lectures from world's top fire science researchers. The main topics of the seminar will be:

- Material behaviour in fire
- Fire dynamics, structure in fire
- Wildland fires /Wildland-urban fires
- Fire detection and suppression

- Evacuation and human behaviour
- Miscellaneous

Six-pages papers will be asked to the participants directly, without previous abstract submission. Submitted papers will receive at least two independent Peer-reviews. All accepted papers will be published in Journal of Physics Conference Series. Deadline for submission of full papers is 1st April 2024.

We sincerely welcome you to attend the symposium to discuss ideas and share knowledge. You can get more information about the symposium visiting the webpage: <https://esfss2024.com/>

The 4th European Symposium on Fire Safety Science will be hosted by the Centre for Technological Risk Studies (CERTEC), a research group affiliated to the Universitat Politècnica de Catalunya (UPC) in Barcelona.

Nordic Fire & Safety Days

The Nordic Fire & Safety Days is the meeting point for the Fire and Safety community in the Nordic countries. NFSD is an event carried out by the Nordic universities and research institutes dealing with risk and fire safety.

The days put focus on risk and fire research in the Nordic countries. Contributions from other countries are more than welcome. The conference language is English. NFSD conferences provide great opportunities to tie bands between fire industry, municipalities, research institutes and universities. At the Nordic Fire & Safety Days you will have the opportunity to get information on different aspects within fire research.

The website is published for abstract submission. The deadline for submitting an abstract is **February 9th 2024**. A template for the abstract (2 pages) can be found here: <https://www.ri.se/en/nfsd>

We are looking forward to seeing you in June 2024!

JOB POSTINGS ON THE IAFSS WEBSITE

The [IAFSS website](#) and its social media will regularly update job postings from universities research institutes.

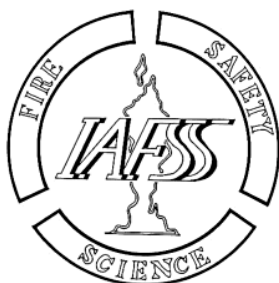
CALL FOR CONTRIBUTIONS

To continue succeeding with this newsletter, it is important that we receive contributions from the IAFSS membership at large. Please consider submitting articles, letters to the editor, images, news, announcements or job openings related to fire safety science of IAFSS members. These could be collected from your department, institution, country or region. Please send your contributions to the Co-Editors (Nils Johansson, nils.johansson@brand.lth.se or Xinyan Huang, xy.huang@polyu.edu.hk).

Letters to the Editor are most welcome, anytime, in response to newsletter content or any other topic related to the IAFSS.

The Next Issue (No. 51) will be a Special Issue for the International Symposium.

Deadline for contributing to the next regular Issue (No. 52) will be communicated later.



<http://www.iafss.org>

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