International Association for Fire Safety Science
A charity registered in England and Wales no 800306

Fire Safety Science News

http://www.iafss.org

March 2023, Issue No. 49

Rita Fahy, Editor

Associate Editors: Michael Gollner (USA), Nils Johansson (Sweden), Naian Liu (China), Ai Sekizawa (Japan), and Michael Spearpoint (UK).

Tsukuba city, site of 14th Symposium

Credit: Prof. Masayuki Mizuno, Tokyo University of Science
(Photograph provided to IAFSS website)

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

Secretariat Office: Email: office@iafss.org

TABLE OF CONTENTS

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, you can contact the team of webmasters through office@iafss.org and they'll help you out.

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!*

One-Year Membership – 2023 (£25) Three-year membership (will return for 2024-2026) is £75 (3 x £25)
Student Membership – 2022 (£5*) Lifetime Membership (currently suspended)

BENEFITS OF MEMBERSHIP

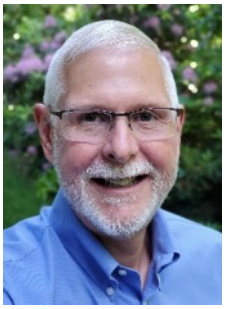
- Symposia attendance at special member rates
- Free Digital Access to Elsevier's *Fire Safety Journal*
- Fire Safety Science News (Official Newsletter of the IAFSS)
- A vote in Association affairs**
- Discounted Symposium Proceedings
- Participation in IAFSS committees
- Participation in IAFSS working groups

** IAFSS student members do not have a vote in Association affairs.

* Registered IAFSS academic members can nominate their students for free IAFSS student membership. Check website for details.

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

LETTER FROM THE CHAIR



What a year this will be for IAFSS! Just into the first quarter of 2023, we have received our new registration from the UK Charity Commission, we are transitioning into our new governance structure, the 14th Symposium planning is well underway, and we will be electing new Trustees and Membership Advisory Council (MAC) for the 2023-2026 term!

As of 20 February 2022, IAFSS is registered in England as a Charitable Incorporated Organisation (CIO), registration number 1202005. The Objects of the CIO are *for the public benefit to advance education and research into the science and practice of the prevention and mitigation of the adverse effects of fire and to disseminate the useful results of any such research*. This is a minor change from the previous, which was required in response to Charity Commission comments during the review and approval process. It reflects well our emphasis on advancing research, education and knowledge transfer in fire safety science and engineering to the benefit of people and our environmental worldwide. With the membership approving the 'winding up' of the previous registered charity at the 6 December 2022 Special General Meeting (SGM), pending approval of the new CIO registration by the Charity Commission, we now just have to move forward with transferring assets and will then close down the previous charity. The process to bring us to this point was longer and more complicated than we first thought, but we are now at the start of a new era for IAFSS. My sincere appreciation once again to Beth Weckman and Barb Waronek for their tremendous efforts on our behalf. Thank you!

Registering the IAFSS as a CIO required new governance documents, importantly a new Constitution, which addresses specific requirements associated with the UK Charities Act 2011. In the crafting of the IAFSS Constitution, we incorporated what we could from our previous rules and moved other material into new IAFSS Rules (Rules) and IAFSS Terms of Reference (ToR) for Officers, Committee and Working Group Members. At the same time, we took the opportunity to enshrine some principles that we had been following as tradition rather than rule, such as balance between regions in our leadership. We also included encouragement of more early career professionals, and increased diversity, into our leadership, in particular on the MAC. In the long term, we hope that service by you on our Committees and Working Groups can help be steppingstones to future service as MAC members and trustees. With the registration of IAFSS as a CIO, we are now operating under the new governance structure. I encourage you to have a look at our new documents, which are all posted on our website, especially if you serve on any IAFSS Committee, Working Group or Task Group. If you are not currently a member of a Working Group or Task Group, please have a look and sign up if your are interested. We would love to have your input and participation in our activities.

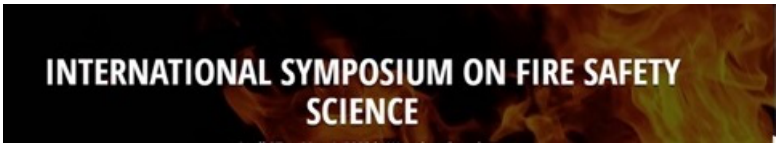
If you follow IAFSS on LinkedIn or other social media, you will see that we have had a awesome response to the Call for Papers for our 14th International Symposium – 341 full paper submittals! This illustrates not only the importance that we and the broader fire safety community place on our symposia, but perhaps the interest by many to return to engaging in person at such a high calibre international event. Papers are currently under review, and the call for Posters and Images is now open. The plan currently remains to hold the 14th Symposium as an in-person event in Tsukuba, Japan, from 22-27 October 2023, with workshops and other activities around it, including our Annual General Meeting (AGM). You can monitor progress on calls, reviews, and registration on the symposium website (https://iafss2023.com/). Thank you to the SPC and LOC and all involved!!! Please remember that if you want to take advantage of the 'member discount' for the 14th Symposium registration fee, you must be an IAFSS member in good standing (that is, have your dues paid for this year), by 31 March 2023. You also need to be a member in good standing to run for office, and to vote (if needed) for Trustees and MAC members. If needed, the vote will occur just after midyear, so that all is in order for announcement at the AGM in Tsukuba. So, please do not wait too long, make sure you membership is up to date by 31 March!

As a reminder on election of Trustees and MAC members, the process is that members indicate their interest (nominate themselves or be nominated) to the IAFSS Nominating Committee (NC). The NC reviews candidates and officially nominates slates of candidates for Trustee and MAC positions. There is then a period for anyone who is not on the NC list of nominees to petition to have their name added. If no one petitions for their name to be added for consideration, then no vote is needed. If additional nominees are added as a result of the petition round, an election will then be required. Please watch for more information on this as the year progresses.

Lastly, I would like to ask each of you – IAFSS members – to share the news about IAFSS and the benefits of being a member – which are available all for the low fee of £25 per year! We do not want to grow membership to show an increase in numbers – we want to engage more of the globally fire safety science and engineering community in IAFSS and facilitate more interactions and opportunities. Since you have seen value in being a member, I hope you can share your experiences and encourage others to take advantage of membership as well.

As always, I sincerely thank you for helping IAFSS advance fire safety science and engineering around the world.

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



Follow us on social media!

Twitter: #IAFSS2023

LinkedIn: IAFSS2023

Plenary / Invited Speakers

The Howard W Emmons Invited Plenary Lectureship

Prof. David Purser CBE, BSc, PhD, Dip RCPath

Prof. David Purser's work covers all aspects of fire hazard development, escape behaviour and their interactions. He started working in this area during the 1970s, when the large increase in fire injuries and deaths at that time led him to study the effects of toxic smoke and heat on people and their behaviour during fires. His research into escape behaviour, fire dynamics, combustion chemistry and fire effluent toxicity is applied to hazard assessment models, international standards and incident investigations. He has studied hazard development and effects on occupants in fire incidents, serving as an expert witness for cases including the Dupont plaza hotel fire (Puerto Rico, 1986), the inquiry into Mont Blanc Tunnel fire (Mont Blanc, 1999), the Rosepark care home fire (Glasgow, 2006) and the Grenfell Tower fire (2017). He has served on fire safety and fire engineering standards committiees at BSI and internationally since 1980, participating in leading the revision of BS 7974:2019 Application of fire safety engineering principles to the design of buildings, and also participates in ongoing research and technical advice to Government in relation to revisions of the Building Regulations. Formerly a director at the UK Building Research Establishment, He continues consulting as Hartford Environmental Research and is Visiting Professor in fire chemistry and toxicity at the University of Central Lancashire. In 2013 he was awarded the Institution of Fire Engineers Rasbash Medal for outstanding contribution to the advancement of knowledge in fire behaviour, and in 2015 he was appointed CBE for services to fire safety.

Invited Plenary Speakers

Yuki Akizuki, University of Toyama, Japan - *"Evacuation Route Design based on Visibility for Reducing Evacuation Delays"*

Dr. Yuki Akizuki is a professor of University of Toyama. After spending five years in the lighting research and development laboratory of Matsushita Electric Works (now Panasonic), she received her Ph.D. degree from Nara Women's University in 2003. She joined Disaster Prevention Research Institute of Kyoto University in 2003 and studied with Prof. Takeyoshi Tanaka. She got the second doctoral degree of engineering from Kyoto University in 2012. She has especially performed the studies aimed at developing a method for evaluating the visibility of evacuation guide signs and the illumination39f evacuation routes. Her studies have contributed to the planning of evacuation routes for smooth evacuation of evacuees in the event of a fire and other disasters.

Naian Liu, University of Science and Technology of China, China - *"Wildland Surface Fire Spread: Behavior and Mechanism Transformation"*

Prof. Naian Liu is Professor and Director of the State Key Laboratory of Fire Science (SKLFS) at the University of Science and Technology of China (USTC). His research area is focused on wildland fire dynamics, including the topics of extreme fire behavior, wildfire spread, pyrolysis, and material flammability. He has authored over 180 peer-reviewed papers and 16 invited speeches. His contributions have been revolutionizing the theoretical and experimental descriptions of wildland extreme fire behaviors. This work has been published in over 70 journals and proceedings papers. Among these, 32 papers have been published in Proc. Combust. Inst. and Combust. Flame, and also 16 keynote lectures have focused specifically on this topic. He was elected as a Fellow of The Combustion Institute in 2018. Prof. Liu serves in many international organizations, journals, and conferences of the fire safety community. He is or ever held the Chair of the Chinese Section of the Combustion Institute, Vice President of Asia-Oceania Association for Fire Science and Technology, Member of Board of Director of International Association for Fire Safety Science, Member of Board of Director of the Combustion Institute, Member of the International Forum of Fire Research Directors, Member of the Board of Directors of the International Association of Wildland Fire (2014-2018), Associate Editor of Fire Safety Journal (2013-2015), Associate Editor of International Journal

of Wildland Fire (2016-), and Associate Editor of Fire Technology (2016-). Recently, he served as the Program Scientific Co-chair of the 13th IAFSS Symposium and has been serving as the Symposium Planning Committee Co-Chair of the 14th IAFSS Symposium.

Eulalia Planas, Universitat Politècnica de Catalunya, Spain - *"Fires at the Wildland-Industrial Interface: Is There an Emerging Problem?"*

Prof. Eulàlia Planas is a Professor at the Chemical Engineering Department of the Universitat Politècnica de Catalunya (UPC). Head of the Centre for Technological Risk Studies and UPC Coordinator of the International Master of Science in Fire Safety Engineering. She graduated in Industrial Engineering in 1993 and obtained the PhD in Chemical Engineering at UPC in 1996. She became associate professor at UPC in 2002 and professor in 2022. Her main research lines are the study of hydrocarbon pool-fires and jet-fires; the mathematical modelling of major accidents; risk analysis of process plants and in the transportation of hazardous materials; and the study of wildfires. In the field of wildfire research, she has developed infrared image processing systems to quantify fire progression (rate of spread, fire intensity, and flame geometry) and aerial fire attack effectiveness. She has also worked on providing systems to deliver fire behaviour forecasts for decision-making, based on data assimilation and inverse modelling. Currently she also works on the study of the wildland-urban and wildland-industrial interface, developing methodologies based on CFD modelling to study the effects of burning fuels on structures, relying on performance-based criteria to assess building vulnerability and sheltering capacity. Prof. Planas is also involved extensively on experimental fire research.

Stanislav Stoliarov, University of Maryland, USA - *"Pyrolysis Model Parameterization and Fire Growth Prediction: The State of the Art"*

Dr. Stanislav I. Stoliarov received M.S. in Chemical Engineering from the Mendeleev Institute of Chemical Technology (Moscow, Russia) and Ph.D. in Physical Chemistry from the Catholic University of America (Washington, DC, USA). For his Ph.D., Stoliarov performed experimental and computational studies of fundamental mechanisms of reactions involving radicals important in combustion and evolution of planetary atmospheres. Before joining the Fire Protection Engineering Department of the University of Maryland in 2010, Stoliarov spent 8 years working as a researcher for the Ultra Fire Resistant Materials Research Program conducted by the Federal Aviation Administration. At the Federal Aviation Administration, Stoliarov developed computational tools for the modeling of polymer pyrolysis, including MD_REACT and ThermaKin. Stoliarov also made significant contributions to the development of the Microscale Combustion Calorimetry (a new ASTM standard for the measurement of material flammability). At Maryland, Stoliarov teaches a range of upper level undergraduate and graduate classes on the topics of fire dynamics, material flammability and fire modeling. His research group is engaged in a broad spectrum of activities focused on development of experimental and computational approaches to the analysis of flammability of polymeric and composite solids and fire safety of electrical devices. Stoliarov authored close to 100 peer-reviewed publications and over 150 conference presentations and proceedings.

Jennifer Wen, University of Surrey, UK - *"Fire Modelling: The Success, the Challenges, and the Dilemma"*

Jennifer Wen joined the School of Mechanical Engineering Sciences, University of Surrey as Professor in Energy Resilience in January 2023; and is currently in the process of launching a new research centre in Surry. Prior to this, she was Professor at University of Warwick for nearly 10 years, where she established and led Warwick FIRE, a multidisciplinary research laboratory for both fundamental and applied research in fire, explosions and other safety related reactive and non-reactive flows. Jennifer also held positions at Computational Dynamics Limited (founding vendor of STAR-CCM), British Gas plc, South Bank University and Kingston University London, where she was full professor since 2000 and Head of Research for Engineering from 1999-2012. She is a Fellow of the Institution of Mechanical Engineers. She is Vice-Chair of the International Association for Fire Safety Science (IAFSS) and Chair the IAFSS Research Sub-Committee. She is a Steering Committee Member of the British Section of the Combustion Institute, UK Explosion Liaison Group, member and Sub-Task Leader for the European Hydrogen Safety Panel (EHSP), established by the Clean Hydrogen Joint Undertaking of the European Commission. Jennifer currently sits on the Editorial Board of the Proceedings of the Combustion Institute. Jennifer's research covers a wide range of topics including fire dynamics, flame spread, façade fires, battery fires, glazing behaviour in fires, and gas explosions. Her expertise is primarily in computational fluid dynamics (CFD) modelling of fire and explosions. She has applied fundamental combustion science to study a wide range of fire scenarios including liquid pool and gas burner fires, single and multi-phase jet fires, flame spread over solid and liquid fuels, façade fires as well as fires in buildings and tunnels. Her expertise further extends to fire and explosion safety in emerging energy technologies, especially hydrogen and batteries.

14th IAFSS Symposium – Call for Posters and Images

The International Association for Fire Safety Science (IAFSS) is excited to announce the **Call for Posters** and **Call for Images** for the upcoming **14th International Symposium on Fire Safety Science** to be held in **Tsukuba, Japan on October 22-27, 2023**.

The Calls can be downloaded from the IAFSS website here (Call for Posters) and here (Call for Images) and can be submitted on the EasyChair system at this link **starting on June 1**: https://easychair.org/cfp/IAFSS2023. The Calls are **open until June 30**.

Posters presented at the 14th international symposium will be considered for the following Awards, based on technical content, organization and visual presentation:

- Best Poster Award: selected by the poster awards committee.
- Best Student Poster Award: selected by the poster awards committee.
- •Delegate's Choice Poster Award: selected by the Symposium Delegates.

Images presented at the 14th International Symposium on Fire Safety Science will be considered for the Best Image Award, which will be awarded to the best fire safety science related image based on originality, scientific significance, and artistic/aesthetic appeal. The selection will be made by the Symposium Delegates.

14th IAFSS Symposium – Symposium Planning Committee Leadership

The International Association for Fire Safety Science (IAFSS) is delighted to announce that the 14th International Symposium on Fire Safety Science will be held from October 22 – 27, 2023 in Tsukuba, Japan.

The IAFSS Symposium, organized triennially since 1985, is the premier fire safety science meeting attracting researchers, students and fire protection engineers from across the globe. The five-day symposium will feature invited lectures from world leading fire researchers, parallel presentations of peer-reviewed papers, and poster sessions for recent work. Symposium activities will be preceded by a series of weekend workshops. In addition to the technical sessions, numerous social activities are planned to provide informal meeting and net- working opportunities for colleagues and friends.

Symposium Planning Committee Co-Chairs
Prof. Naian Liu
Prof. Anna Stec
Prof. Arnaud Trouvé

Program Scientific Committee Co-Chairs
Prof. Erica Kuligowski
Dr. Yi Wang

Local Organizing (Host) Committee Co-Chairs
Prof. Ritsu Dobashi
Prof. Kazunori Kuwana
Prof. Yuji Nakamura

Program Communication Committee Co-Chairs
Prof. George Boustras
Prof. Brian Lattimer
Prof. Cristian Maluk

Technology Committee Co-Chairs
Prof. Xinyan Huang
Prof. Nils Johansson
Prof. Beth Weckman

Program Proceedings Committee Co-Chairs
Prof. Luke Bisby
Prof. Bart Merci

Poster Committee Co-Chairs
Prof. Nieves Fernandez Anez
Prof. Andres Fuentes

Images Committee Co-Chairs
Prof. Ken Matsuyama
Prof. Pedro Reszka

Workshop Committee Co-Chairs
Prof. David Lange
Dr. Sarah Scott
Prof. Wojciech Węgrzyński

Diversity, Equity and Inclusivity Committee Co-Chairs
Dr. Jason Floyd
Prof. Rosaria Ono
Courtney Devine
Dr. Izabella Vermesi

Early Career Committee Co-Chairs
Ms. Bronwyn Forrest
Prof. Jie Ji
Prof. Francesco Restuccia

English Language Mentoring Chair
Dr. Colleen Wade

Awards Committee Co-Chairs
Dr. Tuula Hakkarainen
Prof. Longhua Hu
Prof. Albert Simeoni
Prof. Stanislav Stoliarov
Prof. Takeyoshi Tanaka
Prof. Jennifer Wen
Prof. Hideki Yoshioka

IAFSS Chair
Dr. Brian Meacham

IAFSS Past Chair
Prof. Patrick van Hees

15th IAFSS Symposium Local Host
Prof. Thomas Rogaume

Program Scientific Committee Members

- Prof S. Bourbigot, University of Lille (France)
- Prof K. Cashell, Brunel University (UK)
- Prof M. Gollner, University of California-Berkeley (USA)
- Prof A. Filkov, University of Melbourne (Australia)
- Prof A. Fuentes, Universidad Técnica Federico Santa María (Chile)
- Dr. R. Hadden, University of Edinburgh (UK)
- Prof S. Hostikka, Aalto University (Finland)
- Prof Y. Hu, University of Science and Technology of China (China)
- Prof X. Huang, The Hong Kong Polytechnic University (Hong Kong)
- Dr. H. Ingason, Research Institute of Sweden (Sweden)
- Professor A. Jeffers, University of Michigan (USA)
- Prof J. Ji, University of Science and Technology of China (China)
- Prof E. Kuligowski, RMIT University (Australia)
- Prof K. Kuwana, Tokoyo University of Science (Japan)
- Prof D. Lange, University of Queensland (Australia)
- Dr. S. McAllister, USDA Forest Service (USA)
- Dr. R. McDermott, National Institute of Standards and Technology (USA)
- Prof K. Moinuddin, Victoria University (Australia)
- Prof R. Ono, Universidade de São Paulo (Brazil)
- Prof P. Reszka, Universidad Adolfo Ibanez (Chile)
- Prof T. Rogaume, University of Poitiers (France)
- Prof E. Ronchi, Lund University (Sweden)
- Prof A. Simeoni, Worcester Polytechnic Institute (USA)
- Prof S. Stoliarov, University of Maryland (USA)
- Prof A. Usmani, The Hong Kong Polytechnic University (Hong Kong)
- Dr. Y. Wang, FM Global (USA)
- Prof E. Weckman, University of Waterloo (Canada)
- Dr. W. Węgrzyński, Building Research Institute (Poland)
- Prof J. Wen, University of Warwick (UK)
- Dr. Y. Xin, FM Global (USA)
- Dr. D. Zeng, FM Global (USA)

CALL FOR CONTRIBUTIONS TO THE NEXT NEWSLETTER

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 Editor (Rita Fahy, rfahy2@yahoo.com).

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

For the next issue (No. 50), the deadline for submissions is August 15, 2023

Updates from IAFSS working groups

Measurement and Computation of Fire Phenomena (the MaCFP Working Group)

The general objective of the "IAFSS Working Group on Measurement and Computation of Fire Phenomena" (abbreviated as the "MaCFP Working Group") is to establish a structured effort in the fire research community to make significant and systematic progress in fire modeling, based on a fundamental understanding of fire phenomena. This is to be achieved as a joint effort between experimentalists and modelers, identifying key research topics of interest as well as knowledge gaps, and thereby establishing a common framework for fire modeling research. The MaCFP Working Group is intended as an open, community-wide, international collaboration between fire scientists. It is also intended to be a regular series of workshops. The first MaCFP workshop was held (in person) on June 10–11 2017 as a pre-event to the 12th IAFSS Symposium in Lund, Sweden; the second MaCFP workshop was held (online) on April 22-23, 2021, as a pre-event to the 13th IAFSS Symposium. Details on the content and outcomes of the first and second MaCFP workshops (called MaCFP-1 and MaCFP-2) can be found on the IAFSS website at https://iafss.org/macfp/.

Call for Participation in MaCFP-3

The MaCFP Working Group is inviting the members of the entire fire research community to participate in the planning of the third workshop (MaCFP-3). The third MaCFP workshop will be held on Sunday October 22, 2023, as a pre-event to the 14th IAFSS Symposium in Tsukuba, Japan.

The workshop will feature comparisons of experimental data and computational results obtained in separate, decoupled, condensed-phase and gas-phase fire configurations as well as in fully coupled cases corresponding to flame spread over a combustible solid. Target configurations will include:

- Liquid pool fire experiments (30-cm and 100-cm diameter pool flames studied at NIST and featuring multiple fuels); see https://github.com/MaCFP/macfp-db/tree/master/Liquid_Pool_Fires/NIST_Pool_Fires
- Controlled co-flow round diffusion flame experiments (13.7-cm diameter ethylene diffusion flames studied at FM Global and featuring an oxygen-nitrogen oxidizer); see https://github.com/MaCFP/macfp-db/tree/master/Extinction/FM_Burner
- 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 1.5-m corner wall configuration (Single Burning Item experiments studied at UMD with MaCFP-PMMA); see https://github.com/MaCFP/macfp-db/tree/master/Fire_Growth/UMD_SBI
- Flame spread experiments in a 2.45-m parallel panel configuration (parallel panel experiments studied at NIST with MaCFP-PMMA); see https://github.com/MaCFP/macfp-db/tree/master/Fire_Growth/NIST_Parallel_Panel

For each configuration, the workshop will include presentations of experimental data and computational results, and analysis of successes, challenges and knowledge gaps. It will also provide time for open discussion and interactions amongst participants.

In addition, we are delighted to report the creation of a new MaCFP sub-group focused on Radiation Heat Transfer Phenomena and led by Simo Hostikka and Fabian Brännström (https://iafss.org/macfp-radiative-heat-transfer-phenomena). This new subgroup is focused on developing new benchmark problems, validation data, specific tools and expertise for improved model descriptions of thermal radiation transport in fire. The radiation subgroup will also contribute to the MaCFP-3 program and report on ongoing efforts to generate synthetic validation data using high-fidelity reference simulations based on a Line-By-Line Photon-Monte-Carlo (LBL-PMC) approach.

Additional information regarding MaCFP-3 will become available in the next few weeks. In particular, a "Guidelines for Participation" document prepared by the Condensed Phase Phenomena and Gas Phase Phenomena subgroups will be shared soon. Please check the MaCFP website (https://iafss.org/macfp/) for updates or contact one the MaCFP Co-Chairs listed below.

Points of Contact for MaCFP

Fabian Brännström, braennstroem@uni-wuppertal.de (Co-Chair, Radiation Heat Transfer Phenomena subgroup)
Morgan Bruns, mbruns@stmarytx.edu (Co-Chair, Condensed Phase Phenomena subgroup)
Simo Hostikka, simo.hostikka@aalto.fi (Co-Chair, Radiation Heat Transfer Phenomena subgroup)
Isaac Leventon, isaac.leventon@nist.gov (Co-Chair, Condensed Phase Phenomena subgroup)
Randy McDermott, randall.mcdermott@nist.gov (Manager, MaCFP repository on GitHub)
Bart Merci, Bart.Merci@ugent.be (Co-Chair, Gas Phase Phenomena subgroup)
Arnaud Trouvé, atrouve@umd.edu (Co-Chair, Phase Gas Phenomena subgroup)

Signed Arnaud Trouvé (MaCFP Working Group Co-Chair)

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

Objectives

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 consists of 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.

Please join us from here.

Management Team

IAFSS LOF&BE Co-Leaders -Samuel L. Manzello, Reax Engineering, USA, Japan; Sara McAllister UDSA Forest Service, USA; Sayaka Suzuki, National Research Institute of Fire and Disaster (NRIFD), 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 Wadhwani, Victoria University, Australia; Yu Wang, USTC, China

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. There will be two 2-hour workshops. One will be hosted by the IRC subgroup and the other will be hosted by the EME subgroup. Table 1 is a tentative schedule. The IRC subgroup also thanks Daniel Gorham for his service to IAFSS LOF&BE and wishes him the best as he transitions into his new position from IBHS to UL FSRI!

Table 1 LOF&BE workshops at IAFSS 2023

Time	Speaker	Contents
20 min	Co-leaders	Introduction
20 min	IRC/EME subGLs	Progress report
20 min		Question and Discussion on progress
30 min	Various speakers	Short presentations for future activities
20 min		Discussion
10 min		Wrap-up

Large Outdoor Fires & the Built Environment Working Group Webinar Series Completed

The webinar series was completed in October 2022. In total, 19 webinars were delivered, as well as eight student webinars! These are listed below. LOF&BE also started its own YouTube channel, so anyone is free to watch any of these interesting webinars. We have moved the IAFSS LOF&BE Channel for public viewing and the reception is very positive! https://www.youtube.com/channel/UCiar3IU5l6YtWC5zTGKYMkg

November 2020 - Samuel L. Manzello (Formerly NIST, now with Reax Engineering) - Welcome to LOF&BE Webinar Series and Snapshot of Recent Research Activities of Interest to Urban and WUI Fires

December 2020 - Sayaka Suzuki (NRIFD, Japan) - Overview of Urban Fire Management in Japan

January 2021 - Amy Christianson (NRC Canada, Canada) - Blazing the Trail: Celebrating Indigenous Fire Stewardship in Canada

February 2021 - Sara S. McAllister (USDA Forest Service, USA) - The Need for Fundamental Wildfire Behavior Research in the Context of the 2020 Fire Season in the Western USA

March 2021 - Raphaele Blanchi (CSIRO, Australia) - Challenges from the 2019-2020 Fire Season in Australia - Role of Science to Improve WUI Fires Understanding and Preparation

April 2021 - Elsa Pastor (UPC, Spain) - WUI Fires in Mediterranean Europe: Current Research and Innovation Actions to Increase Communities' Resilience

May 2021 - Yu Wang (USTC, China) - Overview of Informal Settlement Fires: An Asian View

June 2021 - Ofodike Ezekoye (University of Texas-Austin, USA) - Overview of Large Outdoor Fires in Texas

July 2021 – Off

August 2021 - Stephen Wong (University of Alberta, Canada) - Lessons Learned from Recent Evacuations in California

September 2021 - Emanuele Gissi (CNVVF National Fire and Rescue Service, Italy) - Fighting WUI Fires in Italy: Role of Simulation Tools

October 2021 - Enrico Ronchi (Lund University, Sweden) - Evacuation Modeling for Wildland-Urban Interface (WUI) Fires

November 2021 - Ido Marom (Technion – Israel Institute of Technology, Israel) - Wildland-Urban Interface (WUI) Fires in Israel and the Role of Social Interactions during Evacuation

December 2021 - Jason Sharples (University of New South Wales) - The Role of Local Fire Dynamics in Extreme Wildfire Development

January 2022 Americas Student Webinar Series
- Jacques De Beer (University of Maryland-College Park, USA) - Ignition Quantification of Decking Materials Subject to Firebrand Attack
- Nima Masoudvaziri (University of Buffalo, USA) - Risk Assessment of Wildland-Urban Interface Communities for Wildfires
- Savannah Weisses (University of Texas-Austin, USA) - Firebrand Ignition and Heat Transfer Characterization

February 2022 Africa/Europe Student Webinar Series
- Simona Dossi (Imperial College London, UK) - Statistical Relationships between Wildfire Damage and Building Features in WUI Fires
- Natalia Flores Quiroz (Stellenbosch University, South Africa) - Fire Investigations in Informal Settlements
- Ruben Dobler Strand (Western Norway University of Applied Sciences, Norway) - Improved Home Fire Risk Warnings using Cloud-Based Weather Data Services

March 2022 - Canceled

April 2022 - Russell Parsons (USDA Forest Service, USA) - Prototype 3D Fuel Modeling System Supporting Physics-Based Fire Modeling, Prescribed Fire and Fuel Treatment Analysis

May 2022 - Pedro Reszka, Universidad Adolfo Ibáñez (UAI), Chile - From Risk Mapping to Flammability Testing: Recent Wildfire Research in Chile

June 2022 - Chris Lautenberger (Reax Engineering, USA) - Automated Wildland Fire Forecasting in the Continental USA

July 2022 - Guillermo Rein (Imperial College London, UK) - Smoldering and Wildfires: The Beginning and the End of Flames

August 2022 Asia/Oceania Student Webinar Series
- Amila Wickramsinghe (Victoria University, Australia) - Determining Firebrand Generation Rates Using Physics-Based Modelling
- Ting Xia (USTC, China) - A Brief Introduction to Informal Settlements in China

September 2022 - Dhirendra Singh (RMIT University, Australia) - Evacuation Modelling for Understanding Community Risk from Natural Hazards in Australia

October 2022 - Sara S. McAllister (USDA Forest Service, USA), Sayaka Suzuki (NRIFD, Japan) and Samuel L. Manzello (Reax Engineering, USA, Japan) - IAFSS LOF&BE Co-Leaders Round Table Discussion and Webinar Wrap Up

Large Outdoor Fires & the Built Environment Working Group Publications

We are very happy to announce that a review paper "Review of Research on Human Behavior in Large Outdoor Fires" is accepted in Fire Technology. This was work done in the EME subgroup led by Sayaka Suzuki (NRIFD) and Maria Theodori (Reax Engineering) (then EME subGLs).

N. Elhami Khorasani, M. Kinateder, V. Lemiale, S.L. Manzello, I. Marom, L. Marquez, S. Suzuki, M. Theodori, Y. Wang, S. Wong, Review of Research on Human Behavior in Large Outdoor Fires, *Fire Technology,* (2023) (accepted 2023/2/16)

Y. Wang, R. Wadhwani, S. Suzuki, M. Theodori, E. Asimakopoulou, J. De Beer, N. Flores, M. A. Ibrahim, H. Johanna, H. Mitchell, S. L. Manzello, A. Wickramasinghe, C. L. (Farian) Wu, and T. Xia, 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*, 2022 May. https://doi.org/10.5281/zenodo.6544760

E. Ronchi, S. Wong, S. Suzuki, M. Theodori, R. Wadhwani, 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)

IAFSS Working Group on Human Behaviour in Fires (HBiF)

Following up on our activities during the last 2021 IAFSS symposium, we are continuing to engage in our first priority: the development of a research roadmap for the field of Human Behaviour in Fire (HBiF).

Progress is ongoing on our task to document research needs for applied research and possibilities for fundamental research in HBIF (this work is led by Natalie van der Wal and Erica Kinkel). We are also working on mapping out existing research in HBiF through a bibliometric analysis (this is led by Milad Haghani, Ruggiero Lovreglio, and Mary Button). These research tasks will allow us to identify gaps in the field and eventually assess the reasons behind them, thus ultimately being able to develop a research roadmap.

The IAFSS HBiF working group is also engaged in a webinar series. Recordings of our webinar events are available on the working group's YouTube channel. You can subscribe to our YouTube channel here:
https://www.youtube.com/channel/UCSqMIEaZ08r5BrtOb5q2d0Q

The most recent webinars we hosted were:

Webinar 5 - Virtual reality for evacuation research - Opportunities and challenges – by Yan Feng and Ruggiero Lovreglio -
Recording: https://www.youtube.com/watch?v=9Gy67_iDVLY

Webinar 6 - Common mistakes in the statistical analysis of evacuation data – by Nikolai Bode –
Recording: https://www.youtube.com/watch?v=OTh5rcgTgmA

Work is also proceeding in the organization of a thematic workshop for the 2023 IAFSS Symposium.

Follow us: Twitter: @HBinFire and at LinkedIn: https://www.linkedin.com/groups/14004136/

Signed: Erica Kuligowski (RMIT University, Australia) - erica.kuligowski@rmit.edu.au
Enrico Ronchi (Lund University, Sweden) - enrico.ronchi@brand.lth.se

International FORUM of Fire Research Directors Awards

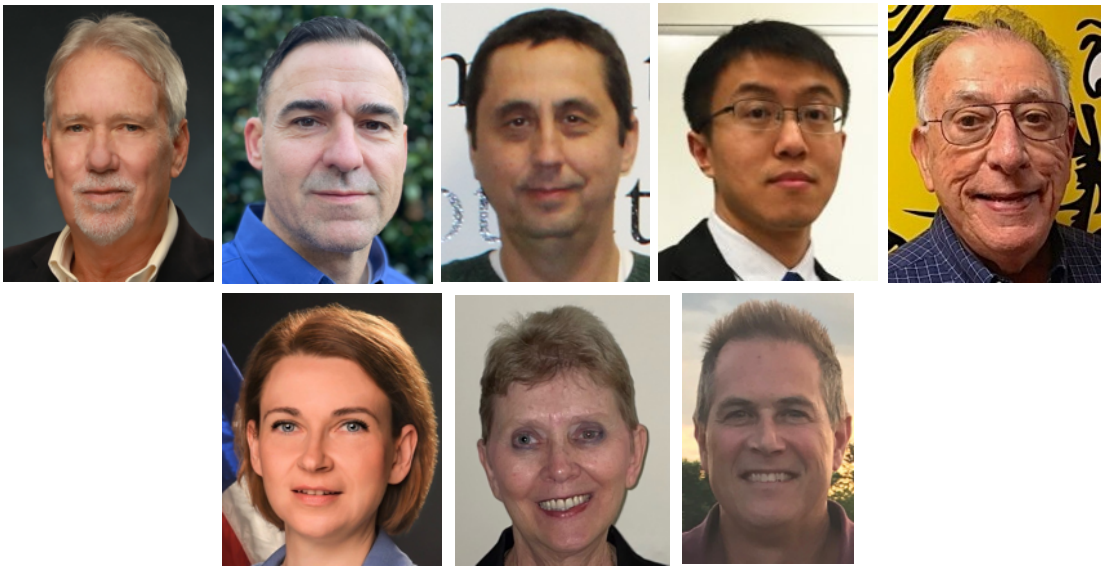
The International FORUM of Fire Research Directors has selected the recipients for the 2021–2022 Sjölin and Mid-Career Researcher Awards.

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 Dr. Noureddine Bénichou, National Research Council Canada, as the recipient of the 2021 Sjölin Award in recognition of his many R&D studies that provided solutions to keep people and buildings safe and avoid economic losses. His global reputation in fire resistance, risk assessment and wildfires arose from developing novel tools and technologies, influencing standards, and leading committees. The FORUM especially acknowledges the development of comprehensive fire risk assessment tools (FiRECAM/FIERAsystem) that combined probabilistic and deterministic models. The tools give designers and officials capacity to evaluate and optimize buildings' fire safety using varied scenarios, minimize business disruption, and provide cost-savings for new/renovated buildings.

The FORUM selected **Dr. Richard E. Lyon, Dr. Richard N. Walters, Dr. Stanislav I. Stoliarov, Dr. Haiqing Guo, Dr. James G. Quintiere, Ms. Natallia Safronava, Ms. Louise Speitel, and Mr. Sean Crowley as the FAA Team,** Federal Aviation Administration, as the recipients of the 2022 Sjölin Award in recognition of the basic and applied research at the interface of materials and fire science carried out by the Team for over 30 years. The FORUM highly appreciates the Team's long-range research efforts to understand the origins of flammability at the molecular level, which enabled the development of lightweight, ultra-fire-resistant materials for aircraft interiors having an order of magnitude better fire performance than was previously available. These fire-resistant materials include



Top row: Dr. Richard E. Lyon, Dr. Richard N. Walters, Dr. Stanislav I. Stoliarov, Dr. Haiqing Guo, Dr. James G. Quintiere Bottom row: Ms. Natallia Safronava, Ms. Louise Speitel, and Mr. Sean Crowley

noncombustible carbon fiber reinforced geopolymer composites as well as an entire family of fire-smart thermoplastic and thermosetting polymers with limited combustibility based on a low-cost bisphenol of dichloroethylene. Collaboration with university, industry and government partners extended the successful fire-smart polymer concept to a family of environmentally friendly, non-halogen polymers. The FORUM especially acknowledges the development of the Microscale Combustion Calorimeter (MCC) as the enabling technology for molecular engineering of these lightweight limited combustibility materials. The method is used worldwide for

research, quality control, and product surveillance by standards and research organizations, polymer producers, material suppliers and aircraft manufacturers.

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 **Prof. Bart Merci**, Ghent University, as the recipient of the 2021 Mid-Career Researcher Award. With this award, the FORUM is recognizing his numerous important contributions to the fire safety science and engineering (FSSE) field, in particular through modeling of turbulent combustion in CFD simulations, and fire and smoke dynamics in enclosures. His world-leading research in the major existing CFD codes for FSSE, is based on a systematic and comprehensive approach, with much attention to the validation of the models and their limits of applicability. In addition to model development, the approach also involves a thorough assessment of the sensitivity of the results to the user's assumptions in the simulations. The FORUM especially acknowledges Prof. Merci's exceptional contributions to FSSE education. He is one of the three founders of the International MSc in Fire Safety Engineering (IMFSE) program which is considered a true landmark, given the strong international collaboration of first-rate universities. His outstanding teaching skills are broadly recognized, as evidenced by the number of leading universities where he has been invited as a guest professor.

The FORUM selected Dr. Anja Hofmann-Böllinghaus, BAM, as the recipient of the 2022 Mid-Career Researcher Award. With this award, the FORUM is recognizing her outstanding achievements in the fields of both fire safety science and fire protection engineering. She is widely known and acknowledged for her work on fire performance of façades. She has studied façades with combustible insulation and the means to ensure their fire safety, and contributed to the development of fire regulations for these assemblies. The FORUM especially acknowledges Dr. Hofmann-Böllinghaus' ability to productively combine experimental studies and numerical simulations. In addition to façades, her research topics also include fire safety issues of buses and cars, investigation of fire development in apartment buildings, and evacuation of people with physical, mental or age-related disabilities.

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.

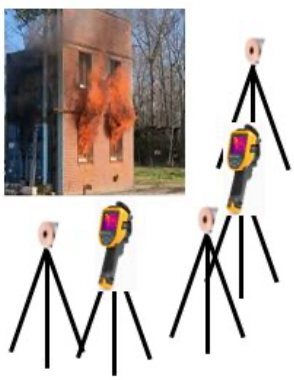
Signed: Dr. Ahmed Kashef, Chair of the FORUM Awards Committee and Dr. Tuula Hakkarainen, Chair of the International FORUM of Fire Research Directors

CALL FOR PARTICIPATION

Intercomparison of heat flux measurement methods and flame image processing

Context of the call: the FRENETICS* project.

The aim of this project is to acquire the scientific and technical knowledge necessary to control the fire safety of facades and to strengthen the research of new low-flammability materials. Using both experimental methods and CFD simulations, studies will be conducted on small (material), medium (panel) and large (system) scales. For the latter scale, Lepir 2 (French standard tests) tests will be performed.



The aims of the call for participation

During the Lepir 2 tests, an inter-comparison of the heat flux measurement methods and the image processing of flames will be proposed to national and international laboratories. This benchmark exercise aims to determine if these non-standard measurements can be applied and are relevant for large-scale tests in order to obtain suitable data and needed to improve the understanding of phenomena and make recommendations for the test standards in future. All people interested by the calibration/validation issue of heat flux sensors or vis/IR imaging will be able to use this test to install their existing or new measurement systems or devices.

No conditions required for participation, except

- to make available the obtained measurements,
- to participate in the analysis of the advantages and limitations of the devices, in order to improve the measurements of heat fluxes and the imaging techniques in the case of large-scale tests.

The LEPIR 2 tests will be carried out at the Efectis France - Laboratoire des Avenières 149 Rte du Marc, 38630 Les Avenières Veyrins-Thuellin

- Electrical connection will be provided
- Expected date: **last semester of 2023**

Contact person: Alexis Coppalle, CORIA Laboratory , alexis.Coppalle@coria.fr

***Fire REsistaNce of External Thermal Insulation Composite Systems, *supported by a grant of the French National Research Agency (ANR) as part of the contract ANR-19-CE22-0007* - https://www.coria.fr/anr-frenetics/**

The participants of the project are

- UMET , University of Lille (France),S. Bourbigot, serge.bourbigot@univ-lille.fr
- CORIA, INSA Rouen (France), A. Coppalle, alexis.coppalle@coria.fr
- P-PRIME University of Poitiers (France),T. Rogaume, thomas.rogaume@univ-poitiers.fr
- Efectis-France),V. Drean, virginie.drean@efectis.com

NEWS FROM MEMBERS

News from the International Master of Science in Fire Safety Engineering (IMFSE)

IMFSE: Graduation Day 2022

Every year IMFSE organizes a Graduation Ceremony at the end of June. Thankfully, it was possible to finally organize this event again in real life on the 27th of June 2023. Last June we did not only celebrate the graduation of the class of 2022, but we also invited the alumni of the class of 2021 and 2020, who had an online graduation day during the pandemic. Almost 150 people joined to share this beautiful moment together (Pictures IMFSE Graduation Ceremony)!

Celebration of 10 Years of IMFSE

One day after the Graduation Ceremony last year, on 28 June 2022, we had our Celebration of 10 years of the International Master of Science in Fire Safety Engineering. During this event we looked back on the past years, with several interesting and inspiring speeches by our lecturers, alumni and contributors, accompanied by musical intermezzos. This event was a true trip down memory lane!

Aftermovie: https://vimeo.com/761399499
Interviews: https://vimeo.com/741553036
Pictures: 10 Years of IMFSE Celebration

Awards and prizes IMFSE alumni

Haydn Lewis wins the IWMA Young Talent Award

In 2022, the IWMA scientific council declared Haydn Lewis the winner of the 2022 IWMA Young Talent Award / Master. (Link to the article)

Haydn Lewis completed his IMFSE master's dissertation ("Factors influencing the generation of carbon monoxide in fires partially suppressed through water mist application") in 2020, under the supervision of Dr. Nils Johansson (Lund University).

Lea Elhokayem wins the best thesis award at the Nordic Fire & Safety Days conference

Recently graduated IMFSE student Lea Elhokayem received the best thesis award at the Nordic Fire & Safety Days conference in Lund. The Nordic Fire & Safety Days is a biannually conference carried out by the Nordic universities and research institutes dealing with risk and fire safety.

Fire Science Show (Ep.73) - Extracting the secret of IMFSE

Fire Science Show is connecting fire researchers and practitioners with a society of fire engineers, firefighters, architects, designers and all others, who are genuinely interested in creating a fire-safe future. In episode 73, programme directors Bart Merci and Eulalia Planas were invited to talk about the secret of IMFSE. In the podcast they talk about what makes a great fire engineer, why IMFSE is successful and what differentiates IMFSE from others in the world.

Two new contributors for IMFSE: Hydrock And Sodeca

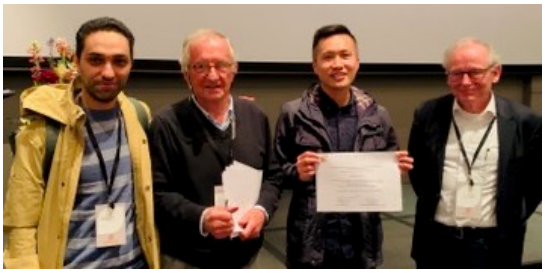
IMFSE has welcomed two new contributing companies: Hydrock and Sodeca ! The financial contribution of the IMFSE contributing companies makes it possible to offer full and partial scholarships. So far, over 30 IMFSE students have already benefited from this mechanism.

Universitat Politècnica de Catalunya is now one of the IMFSE Full Partner Universities!

The IMFSE consortium is very proud and happy to announce that Universitat Politècnica de Catalunya (UPC) is now one of the IMFSE Full Partner Universities, widening the IMFSE scope with world class education on wildfires and industrial fire protection.

Signed: Silke Van Parys, Fire Safety Engineering Administrator

News from Ghent University



Ming-Cian Hong is awarded as a best student presenter at the 10th International Seminar on Fire and Explosion Hazards (ISFEH10) Among 56 presentations at ISFEH10, Ming-Cian Hong was one of the 3 awarded as best student presenter for his presentation of 'A Comparative Study on the Effect of Natural and Forced Convection Correlations on the CFD Simulation Results of Liquid Pool Fires'.

Prof Alexander Snegirev strengthens the FSSE group

Since 1 September Prof Alexander Snegirev has joined the FSSE research team. Alex has established an international career as academic, with specific expertise in turbulent combustion and fire. He will also be closely involved in the teaching in the FSE programs.

Prof Bart Merci and dr. Longxing Yu organize the China Platform Academic Forum 2022 event

The China Platform Academic Forum 2022 event on 17 October 2022 demonstrated the fruitful and valuable collaboration between the FSSE team and highly respected Chinese academic institutes.

Ruben Van Coile discusses fundamentals of fire safety on the Fire Science Show and more

Ruben Van Coile was a guest, together with Danny Hopkin (OFR Consultants), on the Fire Science Show (hosted by Wojciech Wegrzynski). The episode focused on probability, risk, and the meaning of a "fire safe design".

Ruben Van Coile has been awarded an ERC Starting Grant for his research proposal AFireTest.

Ruben Van Coile has been awarded a prestigious ERC Starting Grant for his research proposal 'AfireTest', on "Adaptive Fire Testing". The project team will constitute of 3 PhDs, 2 post-docs and Ruben, supported by the larger Structural Fire Engineering team. It will run for 5 years.

Signed: Prof. Bart Merci, Ghent University

News from the University of Waterloo

Project Updates

The University of Waterloo Fire Research Group is proud to announce the award of multiple projects over the past year. In total, the projects will contribute over $1M in research funding and equipment over the next five years.

NSERC Alliance Grant: Fire Safety Theme – Large federal government grant to research 'Next Generation Wood Construction' led by University of Alberta with 6 universities and multiple industrial and government partners. University of Waterloo is collaborating with York University and Laval University on three projects including "Determination of a risk-based framework and performance parameters for fire safety design of timber structures", "Compartment fire dynamics in timber structures under differing ventilation scenarios", and "Design Fires and Charring Rates for Mass Timber Analysis".

National Indigenous Fire Safety Council – Two research projects are underway as part of a joint effort with Indigenous community leaders, as well as researchers from the University of Saskatchewan, York University, and the University of Alberta. The first focuses on better quantifying household fire safety risks, establishing appropriate criteria to aid in future evaluation of fire safety and proposing effective risk-reduction strategies or technologies. The objective of the second project is to identify specific fire hazards in varied Indigenous Wildland-Urban Interface (WUI) communities and suggest a set of 'best practices' for WUI fire safety along with practical implementation strategies. These efforts will result in more robust WUI fire safety guidelines for the entire community.

Interdisciplinary Research with Kinesiology – Multiple sources have been secured for research in collaboration with P. Dominelli of the University of Waterloo Kinesiology Department. Funding sources include the New Frontiers in Research Fund, University of Waterloo Interdisciplinary Trailblazer Fund, and Canada Foundation for Innovation John Evans Leadership Fund. This project will unite Fire Science, Physiology and Artificial Intelligence (AI) to develop a unique, scientifically grounded and population appropriate Fire Safety Companion with the potential to save the lives of the most vulnerable.

Figure 1: Painted steel surface fire test.

DRDC/Royal Canadian Navy – Projects in collaboration with Defence Research and Development Canada (DRDC) focus on studying heat/toxic gas emissions, off-gas formation, and heat release rate of painted steel surfaces under radiant heating. Medium-scale fire performance tests have been completed, see Figure 1.

NSERC Discovery Grant funding contributes to the current efforts of developing new sensor technology and applying it to study full-scale compartment fire dynamics and smoke movement under differing ventilation conditions.

Environment and Climate Change Canada – This research focusses on emissions factors from Canadian forest fuels, including development of new sampling technology to capture and quantify the emission of semi-volatile pollutants from fire chamber experiments. Results will have direct applications to estimating and tracking wildfire emissions.

NSERC Collaborative Research and Development – In collaboration with industry partner Rockwool, this project studies the performance of construction materials and assemblies under realistic fire exposures with aim to improve future models of assembly response to fire.

The group continues to support multiple industry partners in custom research and fire performance testing.

Conference Presentations

Students Alex DiPaola, Jennifer Ellingham and Professor Weckman presented two papers to the Combustion Institute – Canadian Section Spring Technical Meeting 2022 at The University of Ottawa. Entitled "Species Concentrations and Smoke Development in Large-Scale Furniture Fire Tests" and "Smoke Layer Height Threshold Value(s) for the Radiance Method", these papers discuss the movement of smoke and transport of toxic gases throughout a structure during full-scale furniture fires under different ventilation conditions.

Student Bronwyn Forrest, recipient of an SFPE Student Research Grant, presented her poster entitled "Gaseous Measurements from Full-Scale Furniture Fire Environment" at the SFPE 2022 Annual Conference and Expo in

Detroit, Michigan. This work highlighted preliminary findings on the gas species environments and potential occupant exposure that evolves inside homes during under-ventilated furniture fires.

Student Updates

We welcome Nicholas Dow, FSRI and Bryn Jones, Conestoga College to the Fire Safety PhD program. We would like to congratulate the following recent graduates:

Vusal Ibrahimli, MASc – Thesis: 'On the Fire Performance of Exterior Wall Materials and Assemblies' now at Morrison Hershfield, Greater Toronto Area.

Claire Yuan, MASc – Thesis: 'Challenges Faced in Application of Fire and Life Safety Design in Current Canadian Building Code' with GHL Consulting in Vancouver.

There are currently 11 MEng, 2 MASc and 7 PhD students in the fire safety program at UWaterloo. In addition, we hosted 2 high school students and 4 co-op students over the past year as they gained experience in research and fire safety engineering with the UW Fire Research Group.

Signed: A. DiPaola, K. Senez and B. Weckman, University of Waterloo

News from the Hong Kong Polytechnic University

PolyU hosts 12th Int Conference on Structures in Fire (SiF)

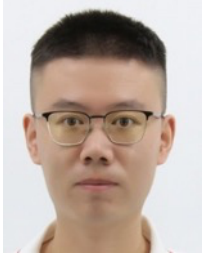
The 12th International Conference on Structures in Fire (SiF 2022) has been successfully held on the PolyU campus from 29 November 2022 to 2 December 2022. Prof. Asif Usmani and Dr Liming Jiang are the co-chairs of local organizing committee. We received more than 200 paper submissions. After reviewing, 110 papers were accepted and presented at the conference online or in person. Over 40 international representatives came to HK and attended the conference in person. The conference also included a workshop for OpenSees for Fire. We thank the support from Croucher Foundation and HKIE and all volunteers.

PolyU fire research group holds Christmas & New Year Party

The Christmas-New Year Party 2022 was successfully held on 22 December 2022 at PolyU. Over 20 members of the Fire Lab gathered together to celebrate Christmas and the new year. With delicious food and drinks, the SFPE Hong Kong Student Chapter prepared mini-games and gifts for everybody. All participants had a wonderful experience and immensely enjoyed the event.

Newly joined researchers

Dr Anthony Chun Yin Yuen joined the PolyU fire research group for the post of Assistant Professor, Presidential Young Scholar Scheme, in January 2023. Dr Yuen obtained his PhD in 2015 from the School of Mechanical and Manufacturing Engineering, University of New South Wales (UNSW), Australia. Before joining PolyU, he was a lecturer at the School of Mechanical and Manufacturing Engineering. He was also the former Centre Manager of the Australian Research Council (ARC) Training Centre for Fire Retardant Materials and Safety Technologies. Dr Yuen's research interests include computational fluid dynamics, composite materials, fire modelling, machine learning, material characterisation, molecular dynamics, nanomaterials, and biomaterials.



Dr Jihao Shi joined the PolyU fire research group as a Research Assistant Professor in September 2022. Dr Shi was awarded his PhD from the China University of Petroleum in 2018. Before joining PolyU, he worked as an Associate Professor in the Centre for Offshore Engineering and Safety Technology at China University of Petroleum (East China). Dr Shi's research interests mainly include physics-based deep (machine) learning for real-time gas release and dispersion modelling, explosion risk analysis, and risk-based mitigation design.

Dr Yuxin Zhang is appointed as a Research Assistant Professor in the PolyU fire research group in 2023. Dr Zhang got both her bachelor degree and PhD from Tongji University in civil engineering, and was a Postdoc Fellow at PolyU, supervised by Dr Xinyan Huang. Her research interests include underground fire evacuation, human behaviour, fire dynamics and ventilation, underground resilience, and more about the intelligent application and VR in the built environment and multiple hazards. Dr Zhang brings a wealth of technical know-how, research experience, and large-scale evacuation field experience to the team.

Recent Graduates

Dr Peiyi Sun was awarded her PhD with a thesis titled "Dripping Ignition Mechanism and Fire Risks of Thermoplastic Drips", supervised by Dr Xinyan Huang. She established a framework for investigating the dripping fire phenomenon of thermoplastic fuels. The mechanisms of dripping ignition and burning behaviour of the anchored dripping fire have been comprehensively studied. The content of her thesis is now published in four journal papers in *Combustion and Flame*, *Applied Thermal Engineering*, and *Fire Safety Journal*.

Dr Xiqiang Wu, former postdoc fellow (2019-2020) at PolyU Fire Lab and Research Assistant Professor (2020-2022), starts his new position as an Associate Professor at the School of Transportation, Southeast University, Nanjing, China. Xiqiang got his PhD from the University of Hong Kong and was a core member of our SureFire smart firefighting project, and was a postdoc fellow supervised by Dr Xinyan Huang. Southeast University is a top-10 university in China and part of the "985" university program.

Dr Caiyi Xiong, former postdoc fellow (2019-2022), supervised by Dr Xinyan Huang at PolyU Fire Lab, starts his new position as Tenure-Track Assistant Professor and PhD supervisor at the Department of Safety Engineering, South China University of Technology (SCUT), Guangzhou, China. Caiyi got his BEng and PhD from the University of Science and Technology of China (USCT). SCUT University is a top-20 university in China and part of the "985" university program.

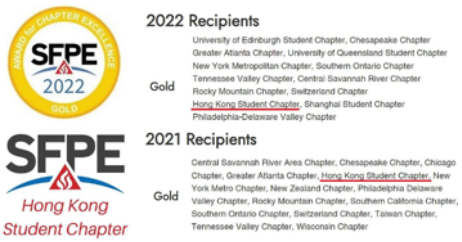
Dr Aatif Ali Khan, former postdoc fellow (2021-2022) at PolyU Fire Lab, starts his new position as a Lecturer at the Department of Civil and Natural Resources Engineering, University of Canterbury, New Zealand. Aatif got his PhD from PolyU, supervised by Prof. Asif Usmani and Dr Xinyan Huang. The University of Canterbury has one of the world's renowned fire engineering programs and State-of-the-Art fire research facilities.

Dr Anwar Orabi, former postdoc fellow (2021-2022) at PolyU fire research group, got his new position as a Lecturer at the University of Queensland, Australia. Anwar got his PhD from PolyU, supervised by Prof. Asif Usmani and Dr Xinyan Huang. His thesis extends the simulation tools of the research group to connect with CAD models, link with CFD tools, and perform nonlinear thermomechanical analysis of building structures. The University of Queensland is one of the top public universities in Brisbane City, Australia. It is ranked 50th in QS World University Rankings 2023.

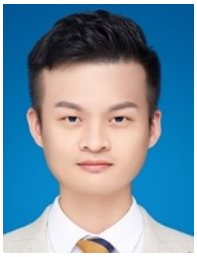
Student achievements

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. The academic advisors are Dr Xinyan Huang and Dr Liming Jiang. Since winning the Gold Medal in 2021, the chapter has won the Gold Medal again after organising many seminars/webinars and other events in 2022.

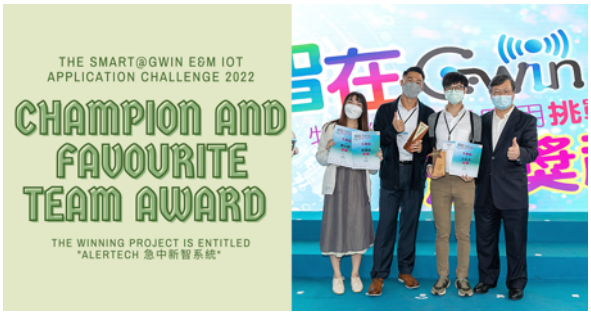


Shaorun won thesis award from CFPA



Dr Shaorun Lin's PhD thesis, "Fundamental Study of Near-Limit Smouldering Fire Dynamics", Supervised by **Dr Xinyan Huang** receives the 2022 Best Thesis Award from China Fire Protection Association (CFPA). Shaorun is one of the 12 awardees. This is the first time a PhD thesis from Hong Kong winning this award. Currently, Shaorun is a postdoc fellow at the University of California at Berkeley under the PolyU joint postdoc program.

Ho Yin won the EMSD award

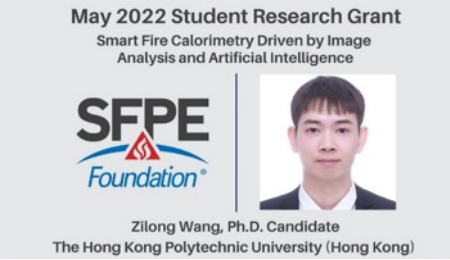


Ho Yin Wong (PhD student) and his start-up company GABES proposed an Alertech that won the Champion and the Favourite Team Award in the "Smart @Gwin E&M IoT Application Challenge" organised by the Electrical and Mechanical Services Department (EMSD), HKSAR Government. EMSD aims to use innovative IoT technologies to upgrade 8,000 government buildings, facilities and infrastructures, enhancing the life quality of the public. Ho Yin is now doing his PhD research on smart fire evacuation under the supervision of Dr Xinyan Huang.

The other entrepreneurial team attended the digital future challenge ideation gala

The entrepreneurial team of Wai Kit (Wilson) CHEUNG (PhD student) and Meng Wang (Research assistant) won 1st place in the Innovation Award at the Future Digital Challenge Ideation Gala with their Firefighting Metaverse project. This project has been admitted into the Hong Kong Science and Technology Parks Corporation (HKSTP) IDEATION Programme for financial grants.

Zilong won the SFPE Student Research Grant



Zilong Wang (PhD student of Dr Xinyan Huang) won the Student Research Grant from the Society of Fire Protection Engineers (SFPE), and there are only four awardees worldwide. SFPE will provide US$5,000 to Zilong for conducting independent research related to Smart Fire Calorimetry Driven by Image Analysis and Artificial Intelligence. Zilong is the 2nd awardee of this student grant in PolyU and Asia after Shaorun won the 1st one in 2021.

Signed: Dr Xinyan Huang, The Hong Kong Polytechnic University, Hong Kong, China

1. Fires to Watch in this Reporting Period

At least four big fires in downtown areas occurred and liberated huge amount of smoke affecting neighbours since December 2022. These included a shopping mall [1]; a galvanized steel sheet rooftop structure of an old residential area [2]; and a deluxe residential building fire [3] started from a domestic karaoke appliance due to short-circuiting. The fire was upgraded to No. 3 alarm (explained in Wikipedia) with a fire officer and a security guard in critical condition. Another fire broke out in a flat in a residential building [4] with 285 residents evacuated.

A blaze broke out from a hut built of galvanized steel sheet at 4:11 am of 27 January 2023 [5]. This is similar to the squatter settlement fire half a century ago [6], which was just started to develop due to limited land space. The fire was upgraded to No. 3 alarm at 4:39 am and was put out at around 7:00 am. About 150 firefighters were deployed to fight the blaze. The firefighters reported that fire was fierce and the affected area was large while the water source was located far away, making the firefighting difficult.

A big fire broke out in an industrial building under refurbishment at 5:17 am on 28 January 2023 [7]. The fire was upgraded to No. 3 alarm fire at 8:53 am. Firefighters from the Fire Services Department took almost 10 hours to bring the blaze under control. The blaze burned for 15 hours and was finally put out. The blaze started in a unit on the 9th floor, which was used for storing electronic components. The building was under renovation when the blaze broke out, with scaffolding on the outside of the building, and some nearby road sections were closed for safety measures. Safety of the scaffolding should be watched. This factory fire exposed at least two concerns in relation to fire safety of industrial buildings:

- Inadequate fire service installations and equipment (no sprinklers, under-sized fire hose, etc.), and
- Poor concept of fire safety management (malfunctioning fire alarm, presence of flammable materials in corridor, etc.).

All these incidents suggest that fire safety has to be actively promoted.

2. Fire Safety Management

As observed in the above industrial buildings fires [7], fire detection and alarm systems were not working, burning lots of plastics materials to give toxic smoke and a hazardous environment. It is difficult for such old tall buildings to match up with new requirements as revealed in the investigation of the big Garlety Building fires 1996 [8].

The spokesman of the Fire Engineering Discipline of the Hong Kong Institution of Engineers interviewed on TV news [9] criticized that the upgrading of old buildings to meet new fire safety requirements was slow. However, an old building hardly has sufficient space to accommodate sprinklers, even the structural loading design of old buildings in Hong Kong has a high safety factor.

It is well demonstrated [8] that upgrading of hardware is difficult. In Hong Kong, 280,000 letters were issued to owners of old industrial buildings, as disclosed in that TV news [9]. Further, adding sprinklers is not practical as demonstrated for over 20 years; it might give adverse effects if poorly designed. Certainly the sprinkler approach is not an ideal option for most of the old industrial buildings. It is urgent to implement modernized Fire Safety Management with promotion of safety culture, and raising penalty too.

3. Safety Culture

The penalty associated with safety in general in Hong Kong was very low before. For instance, penalty for the tower crane accident in 2007 was only HK$36,000 (US$4,500) [10,11]. Consequently, nobody cared to invest properly to ensure safety. This led to serious criticisms and in response the Safety & Health Circular No. 10/2009 Alert on Safe Handling of Tower-Crane Lifting Operations was issued by the government in July 2009 [12,13].

It is very difficult to implement safety under this culture. The penalty should be significantly raised to alert different parties to be more responsible on safety.

The safety culture seems to be changing recently. As cost is always a concern, penalty is a key point to consider. Government actions on having tighter occupational safety and health control and penalty were raised at the Legislative Council recently [14]. The recent incidents of tower crane collapse [15,16] and the falling down of a huge LED screen in a concert in 2022 [17] are more serious cases, and the latter is even a criminal case. Further, two medical doctors were charged in 2022 against criminal offense on a case in 2017 [18]. Safety aspects should be watched more carefully by responsible persons and top management of the organizations. Demand on recruiting more safety experts with practical experience is expected to be higher.

4. New University Academic Staff

Young researchers on fire safety have joined or will join the higher educational institutes as Assistant Professors, which are tenurable positions. Publishing adequate number of quality papers in top 10% of journals listed in Science Citation Index as first or corresponding authors will be good. In addition, research funding of awarding 2 Research Grants Council (RGC)–General Research Fund projects in 6 years will be useful for tenure.

5. Research Impact

A Research Impact Fund was funded by RGC to a collaboration project with two local universities in early 2023. This project is on fire-safe double-skin green façades with energy-harvesting design in tall green buildings. Fire research focus will be on examination of the hazardous scenario created in the façade cavity by a window plume from a flashover fire in an adjacent room. This topic is very relevant to local Building Services Engineering with impact on the industry, particularly supported by the Fire Services Department.

References

1. The Standard, "Man sent to hospital, about 100 evacuated in fire at Mong Kok building's podium", 10 December 2022. https://www.thestandard.com.hk/breaking-news/section/4/198084/
2. Dimsumdaily Hong Kong, "Fire breaks out at zinc structure on top of building in Mong Kok, 20 cats certified dead", 20 January 2023. https://www.dimsumdaily.hk/fire-breaks-out-at-zinc-structure-on-top-of-building-in-mong-kok-20-cats-certified-dead/
3. The Standard, "Firefighter and security guard from Mid-Levels fire still in critical condition", 24 January 2023. https://www.thestandard.com.hk/breaking-news/section/4/199563/
4. Dimsumdaily Hong Kong, "Apartment unit at Grandway Garden in Tai Wai catches fire, 1 injury reported", 29 January 2023. https://www.dimsumdaily.hk/apartment-unit-at-grandway-garden-in-tai-wai-catches-fire-1-injury-reported/?utm_source=rss&utm_medium=rss&utm_campaign=apartment-unit-at-grandway-garden-in-tai-wai-catches-fire-1-injury-reported
5. The Standard, "Two sent to hospital over fire at Tsuen Wan tin sheet house", 27 January 2023. https://www.thestandard.com.hk/breaking-news/section/4/199644/
6. C.H. Cheng, C.L. Chow, T.K. Yue, Y.W. Ng and W.K. Chow, "Smoke hazards of tall timber buildings with new products", Encyclopedia, Vol. 2, No. 1, p. 593-601 (2022).
7. The Standard, "One hospitalized as San Po Kong fire burns for more than four hours", 28 January 2023. https://www.thestandard.com.hk/breaking-news/section/4/199666/
8. W.K. Chow, "On the fire safety requirements for existing old buildings", International Journal on Engineering Performance-Based Fire Codes, Vol. 9, No. 1, p. 31-37 (2007).

https://www.academia.edu/79723821/On_the_fire_safety_requirements_for_existing_old_buildings
9. TVB News, "No. 3 alarm fire at San Po Kong – Expert says: difficult to complete the improvement of the fire protection facilities in all old industrial buildings in Hong Kong in two years", 28 January 2023. (In Chinese) https://news.tvb.com/tc/local/63d4fa4f00c6ca71e4478a94
10. W.K. Chow, "Several points to note for passenger planes safety", Invited Speech at Civil Aviation Operational Safety Conference, Organized by Sichuan Provincial Key Laboratory of Civil Aircraft Fire Science and Safety Engineering, College of Civil Aviation Safety Engineering, Civil Aviation Flight University of China, and others, Guanghan, Sichuan, China, 10-11 December 2022. https://www.academia.edu/94602274
11. Oriental Daily, "Court News: Company fined HK$36000 over two deaths in tower crane collapse", 3 December 2009. (In Chinese) http://orientaldaily.on.cc/cnt/news/20091203/00176_072.html
12. Legislative Council Panel on Manpower Safety in the Use of Tower Cranes on Construction Sites, LC Paper No. CB(2)2480/07-08(01), Labour and Welfare Bureau, Labour Department, July 2008.
13. Hong Kong Housing Authority, Safety & Health Circular No. 10/2009 Alert on Safe Handling of Tower-Crane Lifting Operations, 9 July 2009.
14. Legislative Council Secretariat, "Panel on Manpower. Information note prepared by the Legislative Council Secretariat for the meeting on 18 October 2022. Policies and measures to improve the occupational safety on construction sites", 11 October 2022. https://www.legco.gov.hk/yr2022/english/panels/mp/papers/mp20221018cb2-758-2-e.pdf
15. The Standard, "Three dead, six others injured as Sau Mau Ping tower crane collapses", 7 September 2022. https://www.thestandard.com.hk/breaking-news/section/4/194400/
16. C. Lo, E. Lin, H. Kong and S. Li, "Collapsed tower crane that killed 3 workers in Hong Kong suspected to have had 'obvious faults' at its base", South China Morning Post, 7 September 2022. https://www.scmp.com/news/hong-kong/society/article/3191621/tower-crane-collapses-and-knocks-container-8-workers-hong
17. H. Kong and C. Lo, "Mirror concert accident: fallen screen at Hong Kong show weighed twice value reported to authorities", South China Morning Post, 25 August 2022. https://www.scmp.com/news/hong-kong/law-and-crime/article/3190162/weight-screen-fell-mirror-concert-and-injured-two
18. The Standard, "Docs charged with manslaughter in liver patient's tragic case", 11 January 2023. https://www.thestandard.com.hk/breaking-news/section/4/199062/

Signed: W.K. Chow, Emeritus Professor

News from Lund University

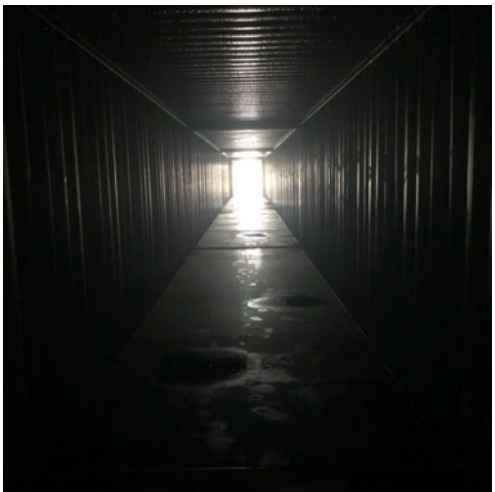
Education

In January the students at the International Master Program in Fire Safety Engineering (IMFSE) arrived in Lund. The 2022 student cohort is the largest class to date! A busy semester awaits the students with courses in Advanced Fire Dynamics, Human Behaviour in Fires, CFD and Risk Assessment.

Preparations are under way to welcome the first students this upcoming autumn to our new local 5-year MSc program in Fire Safety Engineering. This one-of-a-kind program will give the students broad engineering skills and in-depth knowledge in fire science. If you would like to learn more about the new program, please contact nils.johansson@brand.lth.se

Research

The construction of our 60 m medium-scale tunnel for fire tests is soon completed. 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.



Picture from inside the 60 m tunnel

The division of Fire Safety Engineering is part of the WUI-NITY consortium, that has been awarded a new grant from the National Institute of Standards and Technology. WUI-NITY is a platform for the simulation of wildland-urban interface fire evacuation The WUI-NITY 4 project focuses on an integrated software platform that works to enhance life safety in case of wildland-urban interface (WUI) fires by simulating WUI evacuation scenarios. The WUI-NITY tool has been developed over several projects facilitated by the Fire Protection Research Foundation at NFPA with a team from Lund University, Imperial College London, NRC Canada, Movement Strategies/GHD, and Royal Melbourne Institute of Technology. This fourth phase focuses on producing a tested, calibrated, and configurable model that can be used by

stakeholders to assess wildfire evacuation performance in real-world situations. The main contact at the division of FSE for this project is Dr Enrico Ronchi.

The division of Fire Safety Engineering has established a three-year collaboration project with the company Cantene s.r.l. on the topic of tunnel fire risk assessment. This work includes research in the domain of tunnel fire safety. The contacts at the division for this project are Dr Enrico Ronchi and Dr Nils Johansson.

The division has started a new research project on occupational health impact and exposure to air pollution in firefighting. The rescue service has a very risky work situation, often with high physical and thermal stress and potential exposure to a large number of toxic substances, in the event of fires or through emissions in connection with industrial or vehicle accidents. This is the key topic for the research project involving one PhD student at the division. The contact for this project is Prof. Margaret McNamee.

Not My Responsibility! - Improved Wildfire Preparedness through Cross-Sectoral Dialogue, is the title of a newly started research project we are engaged in together with RISE in Sweden. With an increased number of wildfires society's vulnerability against those will increase which in turn requires climate change adaptation strategies among the public, home-owners, municipalities as well as land owners. One PhD student at the division will look into the practical implications and how society should prepare. The contact for this project is Prof. Margaret McNamee.

Lund University is part of a two-year EU project called WUI-TIPS aiming at fire safety in touristic wildland-urban interface areas. The project is led by the Polytechnic University of Catalunya and includes also the Diputació de Girona, Efectis , Entente Pour la Fôret Méditérranéene. The role of our division is to investigate human behaviour in wildfire scenarios in areas where people with various background and spoken languages are present. The main contact at the division for this project is Dr Enrico Ronchi. More information at the project website: https://wuitips.org/

There are several more on-going research projects and some of them are found at www.brand.lth.se. Results from many of them are reported in open access Lund University reports. You can access our publications through our webpage: www.brand.lth.se/publications.

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".

Evalyne Arinaitwe has joined the division as PhD student in early 2023. Evalyne will work with environmental impact of fires under the supervision of prof. Margaret McNamee.

Emelie Lantz successfully defended her licentiate thesis, "Non-career firefighters in rural areas - Exploring aspects contributing to retention", in November 2022.

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

Signed: Nils Johansson, Lund University

News from Linnaeus University

Knight of the Order of the Wood Market 2022

The Knight of the Order of the Wood Market 2022 is awarded to "persons who have brought the development of the industry forward with good deeds".

The justification reads:

"Birgit Östman has worked with fire protection in buildings with a special focus on wooden buildings. Until 1994, buildings over two floors were not allowed to be built with a load-bearing wood frame due to outdated fire safety regulations in Sweden and many other countries. Birgit Östman was a strong driving force in the research and development work that led to the rules becoming material neutral and to methods being developed to be able to meet the new requirements for wooden structures. In doing so, wood made a breakthrough in large buildings. She also initiated research that developed construction through good handling of acoustics and vibrations in wooden structures.

Birgit holds degrees from Lund and Stockholm Universities and is now emeritus at Linnaeus University in Växjö. Fire research began at STFI (Swedish Forest Research Institute) and continued at Trätek (Swedish Institute for Wood Technology Research). She has coordinated large national and international projects and is an expert in international standards committees. She has published numerous scientific and technical articles, research reports and manuals. The latest is the book *Fire Safe Use of Wood in Buildings - Global Design Guide* which was published by a British publisher just a few months ago together with about twenty colleagues from four continents.

Success factors have been to work seriously, to have contacts and create trust in all instances that affect wood construction, such as authorities, research, standardization and industry organizations as well as municipalities, which often initiate wood construction. Birgit has also worked practically in construction projects and imparted knowledge orally. Now she leads courses in expert competence for firesafe wood construction at Linneaus University.

With all this, Birgit Östman has contributed to us in Sweden and the world building more and more climate- and people-friendly in wood."

News from the University of Canterbury

Christmas Tree Burning Event

The UC Fire Engineering Group demonstrated the burning of Christmas trees. The event was hosted at the Fire Laboratory of the University of Canterbury, attracting a diverse crowd of research students, academic faculty, and industry professionals. To illustrate the growth of the fire, Professor Fleishmann set alight three types of Christmas trees: an artificial tree, a freshly cut tree, and a dry tree. It was a valuable opportunity to facilitate dialogue and cooperation among academics and industry professionals, and to demonstrate the hazard associated with this kind of fire to a wider audience.

Academic staff

Prof. Jean-Marc Franssen

The University of Canterbury is proud to announce that Prof. Jean-Marc Franssen will be joining our faculty as Visiting Erskine Fellow. Professor Franssen is a renowned expert in the field of fire engineering, having created SAFIR (Structural Analysis tool) using finite element method for analysing the behaviour of structures during fires. The students at the University of Canterbury will greatly benefit from Professor Franssen's extensive experience and invaluable contributions to the field of structural fire engineering.

Dr Aatif Ali Khan

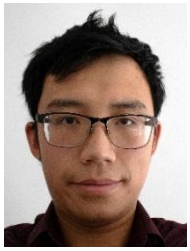
The University of Canterbury welcomed Dr. Aatif Ali Khan as a lecturer in Fire Engineering. He earned his PhD in structural fire engineering from The Hong Kong Polytechnic University. Aatif is also a Chartered Engineer (CEng) from the Institution of Fire Engineers (UK) and a Chartered Member of Engineering New Zealand (CMEngNZ). His research interests include fire modelling, structural fire safety, fire investigation of structural fire accidents and the application of artificial intelligence in fire engineering problems. Currently, he is focusing on developing the fire safety design for firefighters during emergency response and smart firefighting.

New PhD Students

Jeihan Hapsari has just started her PhD which focuses on understanding the vulnerabilities of New Zealand WUI built environment when exposed to wildfires, in the context of a recently granted Minister of Business and Innovation (MBIE) Endeavor Bid "Extreme wildfire: Our new reality, are we ready?". Previously, Jeihan graduated from the Universitas Indonesia for her master degree, research-based with the topic of the dynamics of peatland fires.

Fearghál Gill is a recent arrival to New Zealand starting his PhD in a full-time capacity after beginning his studies abroad. Fearghál's PhD focuses on the simulation of wildfire events using computational fluid dynamics techniques. This research is in part funded by Fire Research Group Ltd and the recently granted Minister of Business and Innovation (MBIE) Endeavor Bid "Extreme wildfire: Our new reality, are we ready?". Prior to arriving in New Zealand, Fearghál worked as a fire safety consultant before and after graduating from the IMFSE (International Masters in Fire Engineering) program. The topic of Fearhál's master's thesis was the simulation of combustible panels in a corner configuration.

Luke de Schot is a PhD student in the fire group under the supervision of Prof. Daniel Nilsson (UC), Assoc. Prof. Ruggiero Lovreglio (Massey University), and Prof. Rob Lindeman (HITLab NZ). His research explores the use of virtual reality (VR) as a data collection method to draw conclusions about individual movement in crowds, specifically how the microscopic level movement of an individual relates to virtual agents in a simulated crowd. Luke has conducted a proof-of-concept experimental study and is now moving on to conduct further experiments to develop a methodology to be able to explore some of the factors that influence the differences in perception and movement between VR and the real world.



Gordon Chen is a PhD Candidate under Assoc. Prof. Anthony Abu and Prof. Gregory MacRae. His research concerns the behaviour of New Zealand steel beam-column joints under fire conditions, intending to understand if the detailing provided to ensure good seismic performance also improves fire performance. His research is funded by the Building Research Association of New Zealand (BRANZ) and the Heavy Engineering Research Association (HERA). He will be conducting full-scale experiments at the BRANZ laboratories nearer the end of his research programme.

Education

The University of Canterbury's Fire Engineering postgraduate program is proud to welcome its new cohort of more than 20 students, who are eager to dive into the world of fire safety engineering. With a focus on providing top-notch academic training, these students will gain the knowledge and skills necessary to excel in the field of fire engineering. Through our unique "Fire Engineering Design" course the students get the chance to be mentored by the professionals from top Fire Engineering companies in New Zealand.

Conferences and workshops

Andres Valencia presented his work on Wildland Fire Behaviour at the IX International Conference on Forest Fire Research in Coimbra, Portugal. His work consisted of largescale shrubland wildfire observations using UAV technology.

In a workshop conducted during the 12th International Conference on Structures in Fire (SiF 2022), Aatif Khan presented his work and explained how OpenFIRE – a tool for conducting CFD-FEM – can be used by researchers and industry professionals in performance-based designs and fire investigations.

Scholarship and research opportunities

Fire research at the University of Canterbury is diverse and encompasses a broad spectrum of areas, such as the fire safety of mass timber buildings, renewable energy systems, and the built environment, as well as Wildland Urban Interface fire design and modelling, smart firefighting, and other related fields.

A PhD opportunity is available in 'Wildland Evacuation'. This PhD research aims to assess if and to what extent different urban planning stakeholders consider wildfire evacuation in the New Zealand context. The objective is to determine the impact and retention of the training outcomes. The subject area for this PhD is Civil Engineering (ENCI). The candidate will be part of a much larger team. If this sounds interesting to you, email Daniel Nilsson at daniel.nilsson@canterbury.ac.nz with the subject line: Wildfire Evacuation PhD. For more information about this research please visit this link.

Another PhD opportunity is available in the field of wildland fires. This research will be focused on studying the wildfire behaviour of different types of fuel (grass, shrub and crown fires) and explore possibilities to use this knowledge in the fire engineering space. If interested, contact Andres Valencia at

andres.valencia@canterbury.ac.nz.

Signed by Dr Aatif Khan, University of Canterbury, Christchurch, New Zealand

News from the Fire Testing and Research Center of Hubei Province

Prof. Guo-Qiang Li received the John L. Bryan Award of SFPE

Prof. Guo-Qiang Li of Tongji University received the 2023 John L. Bryan Award of SFPE. Dr. Li started his career as a lecturer at Tongji University in 1988. He promoted to associate professor in 1991 and to professor in 1994. Prof. Li is the director of the Structural Fire Research Group in Tongji University, the director of Research Centre of Education Ministry of China for Steel Construction and the director of National Research Center of China for Pre-fabrication Construction. He also serves as the Chair of China Association for Fire-Resistance of Steel Construction and a vice-chair of China Association of Construction Standardization.

Prof. Li is one of the few pioneers in structural fire research and education in China. He published the first textbook on structural fire safety design in Chinese in 1999 and established the first structural fire safety education program for undergraduates in China at Tongji University in 2003. He was also the leading person developed the first Chinese code for performance-based structural fire protection design (Shanghai Metropolitan Code in 2000 and National Code in 2006 and 2017). To the end of 2022, Prof. Li had mentored more than 180 graduate students (for Master's and Doctoral degrees) and numerous undergraduate students. More than one third of Prof. Li's graduate students have worked on structural fire safety, many of them are continuing their career in this field through working as researchers, university faculty members and engineers.

Not only being appreciated by his students, former and current, Prof. Li has also been widely recognized by his colleagues, industrial partners and also individuals who he may not ever met for his unselfishly providing expertise to them to assist them in enhancing their education, advancing their careers, and expanding their experience and knowledge in structural fire engineering. Prof. Li established the first national workshop on structural fire safety in China in 2001 and has organized 11 times of the series workshop till 2022. He has also organized more than 40 various workshops, seminars or symposiums on structural fire engineering, small or large, local or international (e.g. SiF'14). Thousands of engineers, researchers and students have been trained in up-to-date development of performance-based design for structural fire safety through participating these activities.

Prof. Li has received numerous awards and honors for his substantial contributions in education, research and engineering. He received the China National Education Prizes in 2009 (class two) and in 2014 (class one), and the China National Science and Technology Prizes in 2014 (for structural fire research). In 2018, the team he leads to teach structural fire safety was praised as the model team of teachers for all the universities of China by the Ministry of Education, and Prof. Li was elected as a foreign member of the Belgian Royal Flemish Academy of Sciences and Arts. His students' research has also received many awards, including the IAFSS Best Thesis Award, the FORUM Sheldon Tieszen Award.

The John L. Bryan Award, established in 2007, is in recognition of John L. Bryan and his more than fifty years of commitment and dedication to educating and mentoring students and practicing fire protection engineers. This award is presented to an individual who exemplifies commitment and dedication to educating, training and advising fire protection engineers. The recipients are recognized for freely and unselfishly providing their expertise to other individuals in order to assist them in enhancing their education, advancing their careers, and expanding their experience and knowledge in fire protection engineering.

The center carried out inaugural on-site fire tests

In August 2022, the researchers of the Fire Testing and Research Center of Hubei Province carried out fire tests in unused self-built houses in a urban-rural fringe in Enshi City in Hubei Province. A total of 14 fire tests were carried out to simulate different fire scenarios for a fire investigation competition program organized by the Department of Fire and Rescue of Hubei Province. Graduate and undergraduate students of the School of Civil Engineering of Wuhan University participated in the fire test and fire investigation activities. 12 teams, composed of about 200 fire investigators, participated in the competition program.

Prof. Chao Zhang visited the Center for Fire Science and Technology of TUS

Prof. Chao Zhang of Wuhan University was invited as a visiting professor and global lecturer of the Tokyo University of Science (TUS) and visited the Center for Fire Science and Technology of TUS in Decemebr 2022. Prof. Zhang delivered two courses on structural fire resistance for graduate students.

(Prof. Mamoru Kohno of TUS (left 2), Prof. Chao Zhang (left 3) and graduate students)

Signed: Chao Zhang, Professor, School of Civil Engineering Wuhan University and Director, Fire Testing and Research Center of Hubei Province

News from the Victoria University Fire Safety Group

In recent years, Victoria University's Fire Safety Group (VUFSG) has been thriving in both fire research and education. The core of the group is formed by Prof Khalid Moinuddin, Professor Maurice Guerrieri and Associate Professor Paul Joseph and. In this group, currently three postdoctoral research fellows (PDRFs) and eight PhD students conducting research. Prof Moinuddin is leading Wildland fire and Fire suppression by water mist research, while Professor Guerrieri leads concrete behaviour in fire research. Associate Professor Paul Joseph is in charge of fire safety engineering courses and materials behaviour research.

Wildland Fire Research

The VUFSG's early research in wildland fire behaviour focussed on the propagation on surface fire (rate of spread, intensity, flame & plume dynamics and heat transfer). The studies investigated the effects of wind, fuel load, slope, fuel moisture content, fuel heterogeneity, merging fires and width of fire breaks. We are using two different

physical (involves both physics and chemistry) models: FDS/WFDS developed by NIST and FIRESTAR3D model jointly developed by Aix-Marseille University and Lebanese University, Lebanon.

The focus is now switched to firebrand generation and transport. In relation to this, two changes to FDS/WFDS have been implemented: (1) Haider and Levenspiel (1989) drag model to account for the sphericity of the firebrands and (2) a firebrand generation model (number of particles as a function of fuel mass loss) based on the experimental studies conducted at Oregon State University, USA.

Our PhD student Amila Wickramasinghe is nearing completion on simulations of firebrand transport on houses. This study is aimed at quantifying firebrand attack in Australian Building Standard in wildfire-prone areas, AS3959. Another PhD student Matthew Kyng is conducting simulations to determine firebrands' landing distributions as a function of atmospheric conditions and fire scenarios to develop a statistical model for an operational model, Spark (developed by CSIRO Data61).

Within last one year, we had one PhD and one MPhil (Masters by Research) completions in this area. Jasmine Innocent studied the combined effect of slope and wind on surface fire propagation at field scale in her PhD project. Ahmed Hassan investigated the combined effect of junction angle, slope and wind one merging surface fire at laboratory scale in his MPhil project. Ahmed will be extended his investigations in his PhD.

Fire Suppression by Water-mist Research

A project to use water mist systems to actively suppress fires involving hydrocarbon-based fuels (funded by the Australian defence industries) has commenced. This is a combined study of experimental work and numerical modelling using FDS. The latest version of the FDS model is capable of modelling suppression of liquid fires within a short period in a completely enclosed room. The study will investigate FDS and other model's capability in modelling suppression in a ventilated room. Dr. Iqbal Mahmud who completed his PhD at Victoria University a few years ago on a similar topic, is working on this project as a postdoctoral fellow. Professor Moinuddin and Associate Professor Joseph are leading this project.

Concrete Behaviour in Fire Research

Prof Maurice Guerrieri developed and designed a NATA Structural Fire Testing Facility which received AS1530.4 Sections 3 and 4 and Efectsis R0695 accreditation in April 2021. The facility, shown in Figure 1.0, is the only one of its kind in Australia with similar facilities involving full scale loading only available in Europe. The facility has been commissioned by Melbourne Metro Tunnel, Westgate Tunnel, Snowy Hydro2.0, Sydney Metro and a vast of other major tunnel infrastructure projects in Australia. The furnace is also equipped with a 4k Nikon based Endoscope system allowing real time video monitoring. The facility also carries out state-of-the-research including full scale research works with COWI UK.

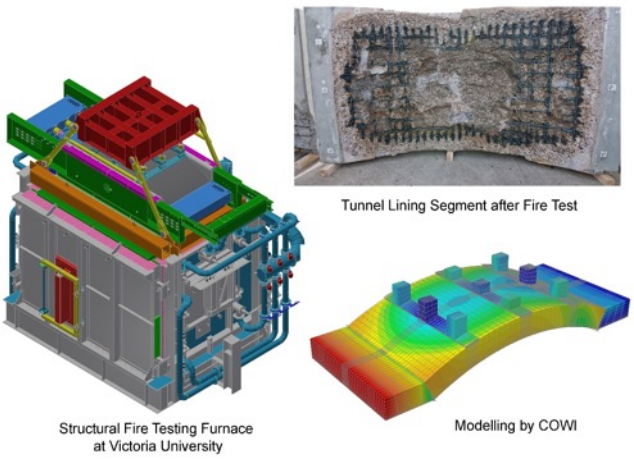


Figure 1.0: Full scale Tunnel Lining Test Frame (left), Tunnel lining segment after fire test (top) and modelling by COWI (bottom)

Fire Properties of Materials

Our PDRF Dr. Malavika Arun has been exploring the fire properties of various combustible and non-combustible materials. These include different species of grass, foliage of pine tree and insulation materials used in the external wall (façade) cavities. Another PDRF Dr. Xuelin Zhang is studying combustion and flame behaviours of aging solid combustibles under different external conditions.

Both PDRFs are guided by Professor Moinuddin and Associate Professor Joseph. Victoria University put great emphasis on materials behaviour research. Recently, a new iCone has been purchased. It is supplied and installed by FTT, UK (Figure 2.0). The equipment is now available for collaboration and commercial testing.

Figure 2.0: New iCone installed at Victoria University

Neythra Weerakkody completed her MPhil (Masters by Research) on developing an intermediate scale fire test for wall cavity materials how they may impact fire spread within cavities. Wall cavity materials are typically regulated based upon small scale fire test methods which do not necessarily

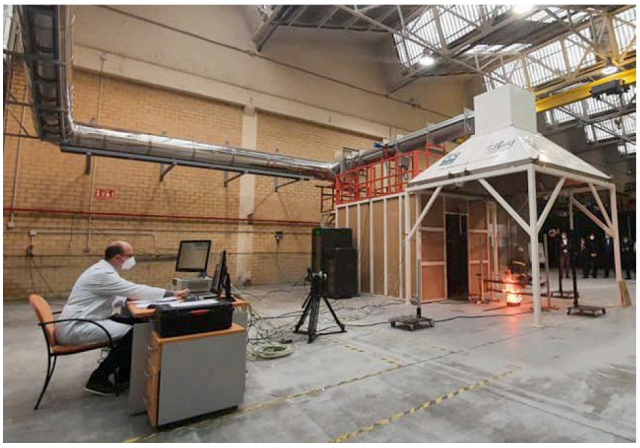
represent the actual fire conditions that can exist within wall cavities. The study involved a modified version of the intermediate-scale FM Global Cavity Fire Test method and a broad range of cavity materials including sarking, polyester insulation , phenolic foam, PIR and EPS was subjected to the fire test.

Signed: Professor Khalid Moinuddin , Victoria University

News from the University of Cantabria

NUCLEVS Project kicks off

At the end of 2022 the research project "NUCLEVS: Validation, calibration and application of fire propagation models in real scenarios of Nuclear Power Plants", was awarded as part of the Spanish Nuclear Safety Council's R&D&I projects 2022 call for proposals. The project aims to carry out an extensive validation phase of the main computational models currently used in the field of fire safety at nuclear power plants and, once the different models have been validated and the conservatism calibrated against experimental test scenarios, the aim is to select the models considered most interesting and develop a methodology that will support Probabilistic Fire Safety Analysts to correctly define the maximum expected fire scenarios (MEFS). This methodology will use Monte Carlo simulations with zone models to define the MEFS to be simulated with models based on computational fluid dynamics. At the beginning of the year the kick off meeting was held with the participation of representatives from the Council were the work programme and first activities of the project were presented. NUCLEVS will be active until the end of 2025.



RAPPID Project kicks off

Natural disasters can and do occur resulting in the loss of properties, resources, and lives. We have recently been granted by the Spanish government and EU to conduct the RAPPID Project (TED2021-132410B-I00/ AEI/10.13039/501100011033/ European Union NextGenerationEU/PRTR). RAPPID is a two-year project aimed at developing a DSS for disasters management to assess the ASET and the RSET for the potentially affected communities and provide results within a few minutes allowing first responders and decision makers to increase their situational awareness as well as anticipating safety strategies and tactics. RAPPID is essentially a deliberate digital transition from using traditional practices to the additional use and support of new scientific-based technologies already available but not fully tested and/or practically implemented in operational conditions yet. The project is based on our previous developments and experience in H2020 EU Projects (LetsCrowd GA740466, ASSISTANCE GGA832576, S4ALLCITIES GA883522).

Final seminar of the OECD/NEA PRISME 3 project

The final seminar of the OECD/NEA PRISME project took place last October. The PRISME 3 programme consisted of three research areas. The first studied the stratification and propagation of smoke during a fire in a multi-compartment facility equipped with a mechanical ventilation system. The second studied the fire spread from an electrical cabinet to adjacent cabinets. Finally, the third studied the fire spread in a cable tray fire located in a confined and ventilated room. In this last area a benchmark exercise (BE) was performed with the main goal of simulate a real cable fire scenario in order to assess the behaviour of fire models for such a complex and real fire scenario. The GIDAI Group of the University of Cantabria has been participating in this benchmark exercise in coordination with the Spanish Nuclear Safety Council by modelling the real fire scenario with a combination of a modified version of FLASH-CAT and the computational model FDS.

Also, taking advantage of the seminar, we had the opportunity to visit the GALAXIE experimental facilities of the Institute de Radiosegurité Nucleaire (IRSN), where all the project tests have been carried out.

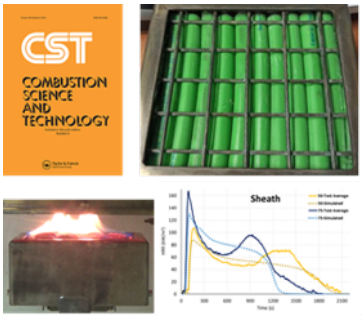
S4ALLCITIES project pilot in Bilbao and final workshop

The second week of October took place in Iurreta and Bilbao the third pilot of the three programmed within the European project S4AllCities "Smart Spaces Safety and Security for All Cities. The project has been funded by the European Union's H2020 Research and Innovation Programme under Grant Agreement GA883522 and aims to ensure safe and protected public spaces in Europe's smart cities. This last pilot was hosted by the Ertzaintza and attended by different partners of the consortium, invited entities and representatives of other European projects that had the opportunity to know the results of S4allcities as well as present the different advances and results of their own projects.

The schedule for the week was divided into three main activities. The first three days were of deployment where all the systems and modules were tested, on the 20th the practical demonstration was carried out to illustrate the end users about the operation of the system and to have the opportunity to have their feedback and interest about the proposed system. Finally on the 21st in the Azkuna Zentroa Alhóndiga in Bilbao, a workshop was held where the results of the project were presented, including the ethical and societal impact assessment, synthesising as a conclusion the most important aspects of the project. Finally, related European projects were presented for the creation of new synergies.

GIDAI Group contributed to S4Allciites by developing tools to improve terrorist threat management and assessment in smart and performing a societal impact assessment. In addition, several members of the research group were active members of the project's Ethics Committee.

Numerical prediction of cables fire behaviour using non-metallic components in cone calorimeter



The journal Combustion Science and Technology has published the paper entitled "Numerical prediction of cables fire behaviour using non-metallic components in cone calorimeter". The paper reflects the research carried out by the GIDAI Group in collaboration with the General Cable Group. The study addressed the analysis of two multi-core cables by characterising sheath and insulation materials individually through inverse modelling. Then, two simulations models were adjusted to represent both cables in cone calorimeter tests. In general, simulation models could represent the heat release rate curve, however they released more energy than experimental tests and some discrepancies in the peaks were observed.

Signed: Mariano Lazaro Urrutia, University of Cantabria

News from the University of Maryland (USA)

National Science Foundation Awards Grant to UMD/Morgan State University Partnership

Morgan State University, in collaboration with the University of Maryland (UMD) Department of Fire Protection Engineering (FPE), has received a grant of $600k from the National Science Foundation (NSF) in what is being called 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.

The grant is a first-of-its-kind awarded to a Historically Black College or University (HBCU) through the NSF Decision, Risk and Management Sciences, Office of Integrative Activities, and HBCU Excellence in Research (EiR) integrated programs to conduct this type of research. MSU's Justin Bonny, an assistant professor of psychology, will serve as the principal investigator (PI), while UMD FPE Professor and Chair, James Milke, will serve as the Co-PI.

Parham Dehghani Receives IAFSS Best Thesis Award

Parham Dehghani (UMD '22) is the winner of the International Symposium on Fire Safety Science (IAFSS) Best Thesis Award for the Americas. His dissertation is entitled *Burning Emulations of Condensed Phase Fuels Aboard the International Space Station*.

Dehghani received his doctorate in mechanical engineering from the University of Maryland (UMD) in 2022 – under the tutelage of Fire Protection Engineering (FPE) Professors Peter Sunderland and James Quintiere – where his research focused on fire safety in microgravity environments. He also holds a bachelor's degree in mechanical engineering from Shiraz University and a master's degree in aerospace engineering from Sharif University of Technology in Iran.

Dehghani, currently a postdoc at Underwriters Laboratories (UL), will be recognized at the 14th IAFSS Symposium in Tsukuba, Japan in October, 2023, where he will also give a presentation.

Kyra Cromwell Reed Receives Philip Merrill Presidential Scholarship

Kyra Cromwell Reed, an undergraduate student in the University of Maryland (UMD) Department of Fire Protection Engineering (FPE), is a Philip Merrill Presidential Scholar for the 2022/2023 academic year.

Reed has been academically strong in her fire protection engineering curriculum, joining both the Tau Beta Pi Engineering Honor Society and the Salamander Honor Society, as well as completing a minor in history. She's highly involved in the department, serving as president of the Society of Fire Protection Engineers UMD student chapter, an undergraduate research assistant, and as a Clark School Student Ambassador in addition to acting as a mentor for the Women in Engineering program.

Reed says her high school and UMD Faculty mentors aided in her pursuit of engineering and ability to take on new challenges. Says Reed, "Professor Isman's enthusiasm for fire protection engineering encourages me to be excited about the field and makes going to class enjoyable."

In the News: Maryland Engineers Advance Holiday Safety, Fire Data Research

Each year, approximately 30 million natural Christmas trees are sold in the United States. While this symbol of the season brings an air of festivity to homes during the holidays, it is also responsible for approximately 160 house fires each year according to statistics from the National Fire Protection Association (NFPA).

To increase public safety awareness about Christmas trees, the University of Maryland Department of Fire Protection Engineering hosts an annual Christmas Tree Burn Demonstration. Now in its ninth year, the event—which is open to the media—features live demonstrations highlighting the potential hazards of this holiday fixture, and in particular, the differences between what happens to a dry versus well-watered tree when exposed to a potential ignition source. "A drier tree has the potential to support easier ignition, faster fire growth, and larger peak fire size," explained Isaac Leventon, who directs the burns.

A video of two of this year's tests is at https://youtu.be/n6ioA9n7HvM

It's Getting Hot in Here
Common engineering and science tropes seen in film and media often inform what people think is possible. To dispel movie myths and show how engineering can be cooler than fiction, University of Maryland (UMD) engineers are taking a deep dive into popular media depictions of engineering in a new video series, Ask An Engineer. In the first episode Clinical Professor Kenneth Isman breaks down the realities of how fire sprinkler systems really work.

Exploring scenes from "Mean Girls" and "Stranger Things" to "The Incredibles" and "The Office," Isman provides an expert take on what the big and small screens get right—and more often, get wrong about the engineering and functions of fire sprinklers.

The video can be viewed here: https://youtu.be/VcC01SN-gmQ

Signed: Peter Sunderland, University of Maryland

News from UL's Fire Safety Research Institute

FSRI Now Part of UL Research Institutes

The UL enterprise recently revealed new brands for its three organizations: UL Research Institutes, UL Standards & Engagement and UL Solutions. UL Research Institutes focuses on rigorous independent research into ongoing and emerging human safety risks. As threats evolve and their consequences become more severe, UL Research Institutes pursues scientific discovery to advance public safety — marshaling resources to scan for and assess emerging human safety risks in areas such as autonomous systems and artificial intelligence. Continuing our focus on addressing the world's unresolved fire safety risks and emerging dangers, the Fire Safety Research Institute is part of UL Research Institutes along with the Chemical Insights Research Institute, the Digital Safety Research Institute, the Electrochemical Safety Research Institute, and the Materials Discovery Research Institute. Learn more about UL Research Institutes at ul.org.

Upcoming Livestream Event
Lithium-Ion Battery Symposium: Challenges for the Fire Service
March 30, 2023 | 8:00 a.m. - 5:00 p.m. EST
Learn more and register here.

New Research Projects:
- Examining the Fire Safety Hazards of Lithium-ion Battery Powered e-Mobility Devices in Homes
- The Impact of Batteries on Fire Dynamics e-Mobility Devices in Homes
- Heat Transfer and Fire Damage Patterns on Walls for Fire Model Validation

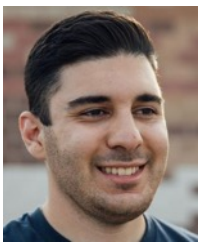
FSRI Research Reports:
- **Study of Firefighter Line of Duty Injuries and Near Misses**
  - Click here to read our "Analysis of a Near Miss in a Garden Apartment Fire - Georgia 2022" investigative research report.
  - Click here to read our "Four Firefighters Burned in Residential House Fire – Georgia" investigative research report.
- **Study of Fire Service Residential Home Size-up and Search & Rescue Operations**
  - Click here to read our three-part research report series on the "Analysis of Search and Rescue Tactics in Single-Family, Single-Story Homes."

FSRI Peer-Reviewed Journal Articles:
  - Click here to read the "*Silicone passive sampling used to identify novel dermal chemical exposures of firefighters and assess PPE innovations"* published in the *International Journal of Hygiene and Environmental Health.*
  - Click here to read the "*Hierarchy of contamination control in the fire service: Review of exposure control options to reduce cancer risk"* published in the *Journal of Occupational and Environmental Hygiene*.

New Online Training Courses
- The Science of Fire and Explosion Hazards from Lithium-Ion Batteries
- PPE: Limitations and Factors that Impact Performance
- Comprehensive Cancer Prevention Strategies for the Fire Service
- Residential Fire Near Miss Incident: LaGrange, GA

FSRI Fellowship Program Welcomes Three Fellows for 2022

Grayson Bellamy is currently a Fire Protection Engineering graduate student at the University of Maryland, College Park. Grayson received his bachelor's degree in mechanical engineering from the University of Georgia in the spring of 2020 but his first hands-on experience with fire protection research began at UL's large-scale fire testing facility in Northbrook, IL. Through a previous internship, he was presented with the opportunity to travel to the facility to observe and assist in large-scale fire testing of commercial fire sprinkler system arrangements. Here, Grayson contributed to experimentation that would ultimately make retail occupancies safer and allowed him to gain a glimpse into the fire protection world.



Thomas DiPietro is completing his undergraduate studies in mechanical engineering, with a concentration in aerospace engineering, at Rowan University in Glassboro, New Jersey and will start with UMB this summer. Thomas is a member of the Bantivoglio Honors College as well as multiple clubs including the American Society for Mechanical Engineers. Since 2018, he has been a volunteer firefighter at the Monroe Township Volunteer Fire Company #1. During the summer of 2021, Thomas conducted a research internship at FSRI where he assisted in experimentation and data acquisition. His research project for the upcoming academic year is currently under development.

Rebekah Schrader is currently a fire protection engineering graduate student at the University of Maryland (UMD). Bekah graduated with her bachelor's degree in fire protection engineering with a minor in global engineering leadership from UMD in May 2022. At UMD, she was a National Fire Protection Association (NFPA) ambassador for the Department of Fire Protection Engineering and part of the Research, Instruction, and Service in Engineering (RISE) Leadership Academy. Through RISE, she participated on a research project that examined decking assemblies and their response to wind-driven firebrand attacks. Additionally, she co-founded a virtual summer camp for high school girls interested in engineering research. Bekah joined the FSRI team in 2019 as a summer intern. During her internship, she worked on wildland-urban interface (WUI) fire research, various literature reviews, and assisted with large-scale experiments. Bekah's graduate work focuses on the failure modes of residential window systems when exposed to exterior fires.

FSRI Welcomes Three Post-Doctoral Researchers

Parham Dehghani holds a bachelor of science degree in Mechanical Engineering at Shiraz University and a master's degree in Aerospace Engineering from the Sharif University of Technology. Originally from Iran, he was admitted to the Ph.D Mechanical Engineering program at the University of Maryland (UMD), where he graduated in 2022. His research is focused on fire safety in microgravity by emulating real condensed phase fuels burning aboard the International Space Station.

Shruti Ghanekar is a Post-Doctoral Researcher with UL's Fire Safety Research Institute (FSRI) and joined the team in September 2022. She holds a PhD and an MS in Mechanical Engineering from University of Illinois Urbana-Champaign and a BTech in Aerospace Engineering from SRM Institute of Science and Technology. Her graduate research focused on developing Infrared Laser Absorption Spectroscopy based measurement systems and deploying them in residential fire environments to quantify and study time-resolved concentrations of combustion species such as water vapor and hydrogen cyanide.

News from Pprime Institute – Poitiers – France

PhD defense of KELLALI Safae - " Experimental and numerical investigation of the thermal decomposition and combustion of a porous lignite medium. Application to Chimney Duct Safety "

Safae KELLALI has supported her Ph-D the 28th of November into the Pprime Laboratory. Her jury was composed of Professors Pascal Boulet (université de Lorraine) and Bernard Porterie (Aix-Marseille université), and the Doctors Jean Lachaud (université de Bordeaux), Virginie Tihey Felicelli (université de Corse), Eric Guillaume (Efectis), Pierre Crémona (Poujoulat SA), as well as her 2 phD directors, Benjamin Batiot and Thomas Rogaume.

The PhD of Safae took place into a collaboration between Pprime Institute and the society Poujoulat.

The jury was very enthusiastic and underlined the very important work done and the many results obtained. These original results are of great added value for the scientific community. Now Safae is a Research & Development Engineer into Electricité de France (EDF).

New PhD student – Pauline Dias Lopes. Study of phenomena at the interfaces between exterior fires and buildings envelopes (FRENETICS projects). Application to buildings insulated from the outside.

Pauline is graduated from Ecole Nationale de Mécanique et Aérotechnique of Poitiers. She already worked at the laboratory for her two internships. The subjects were:

- Decomposition of the lignite at intermediate scale.
- Characterization of the behavior of two external insulation system at intermediate scale.

Due to the development of the external insulation, the last decades years have been marked by facade fires involving a such system (Grenfell Tower fire). Indeed, the insulation system may ad combustible materials on the facade and a heat source, even it is located at distance from the building can represent a danger. An important issue concerns the risk of inflammation and propagation of fire on a such system.

As part of this thesis, the objectives are to characterize the conditions at the interface between an external fire and a facade, the phenomena that take place during the fire and facade interaction and the flame spread on the cladding.

For that, a multi-scale approach will be used to allow the addition of complexity at increasing scale in order to identify the properties and characteristics of materials. Tests will be performed at TGA/DSC, cone calorimeter, on a specific test bench for the intermediate scale and at real scale. The experimental data will be used in order to validate numerical simulation. The materials concerns are:

- A cellulosic material (wood or wood derivative) usually used for an exterior cladding.
- A cladding composed of an insulation, an air cavity and an HPL cladding (high-pressure laminate).
- The simulation will be realised using FDS (Fire Dynamic Simulator) developed by the NIST.

"Fire REsistaNce of External Thermal Insulation Composite Systems - FRENETICS" Project. New results into Pprime Institute

One of the objectives of the projects FRENETICS is to characterize the fire behaviour of systems use for an external insulation of buildings at different scale. At Pprime, tests are performed at intermediate scale in order to study and characterise the decomposition of the system and the spread of the flame. Two insulation system have been retained: an ETICS (External Thermal Insulation Composite System) and a ventilated cladding (HPL cladding).

The intermediate test bench allows to do the following measurements on 50*50 cm^2 and 100*100 cm^2 samples for two different heat flux exposure (30 kW.m-2 and 60 kW.m-2): mass loss and mass loss rate, heat release rate, gaseous emissions, temperatures and heat flux at different heights and depths and the position of the thermal decomposition front.

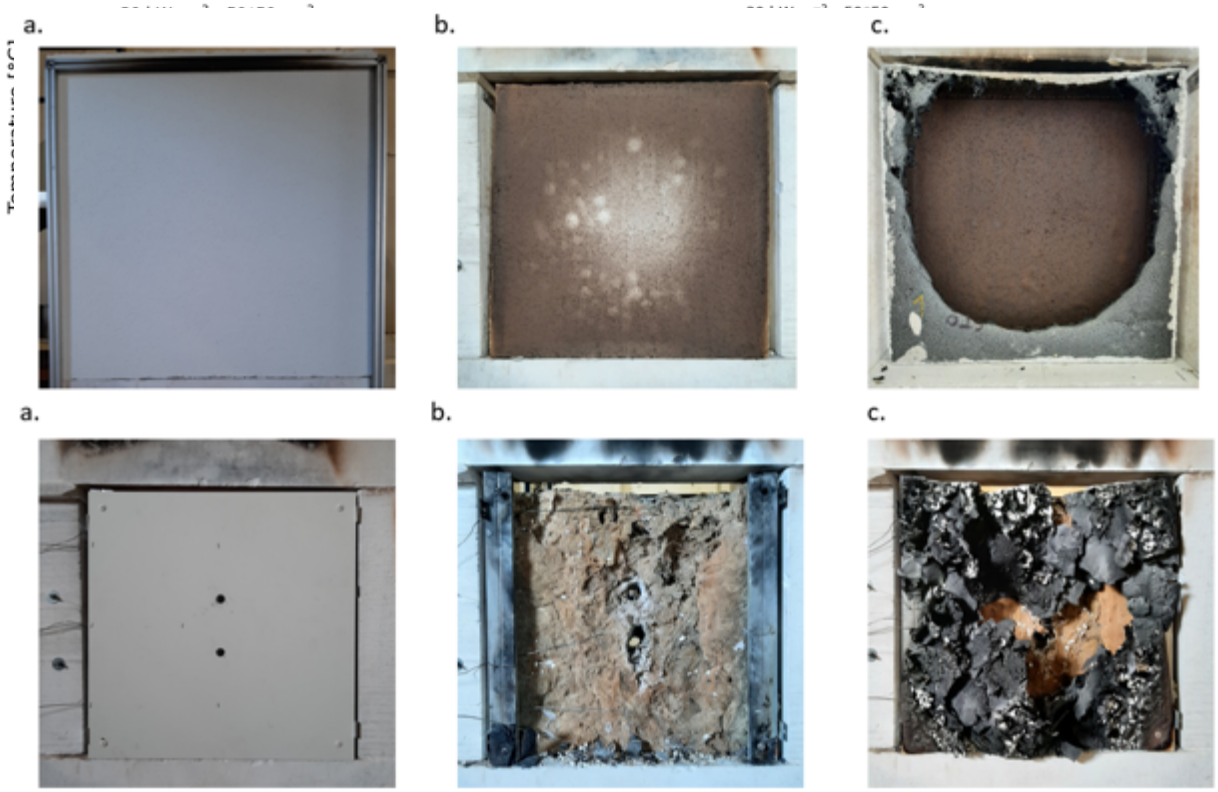
Three scenarios have to be considered:

- The fire source located at distance from the facade element. The fire spread on the cladding.
- The fire source is located on the building. On the case of the break of an opening, the fire can then spread on the facade by the leapfrog effect.
- The fire spread on the air cavity.

The scenario 1 and 3 have been performed for both ETICS and cladding.

The main differences between the two systems concern:

- The structural strength of the insulating system (figure 1): all the HPL cladding is decomposed after the test whereas only the polystyrene of the ETICS is decomposed (the plaster remains solid).
- The temperatures reach during the test. At the maximum, the temperatures reach 300°C for the ETICS system against 1000°C for the cladding. These temperatures are recorded on the middle of the sample



(x=y=25cm).

A new European project: Horizon-JTI-CleanH2, ROAD trailer design – use of Type V theRmoplastic tube with light composite structure for Hydrogen transPort » ROAD TRHYP

This project involves the following partners: Air Liquide, Covess, Arkema France, Politechnika Wroclanska, Efectis France, Segula Slovensko SRO, Segula Engineering France, Envitest and Pprime Institute.

The overall ambition of the ROAD TRHYP project is to demonstrate that a trailer made out of thermoplastic composite tubes (Type V) is a suitable solution to all of the above-mentioned topics. ROAD TRHYP aims at maximizing the quantity of H2 transported while satisfying end-user requirements (safety, ability to be decontaminated) and enforced regulations with a low TCO as specified in the upcoming sections.

Pprime staff is involved into the demonstration of fire safety of type V tubes as well as a representative set of multiple tubes. In addition, it will tackle the safety aspects of pressurized gas up to 700 bars and put forward mitigation measures adapted to type V up to 700 bars and its use in current and future hydrogen refuelling stations.

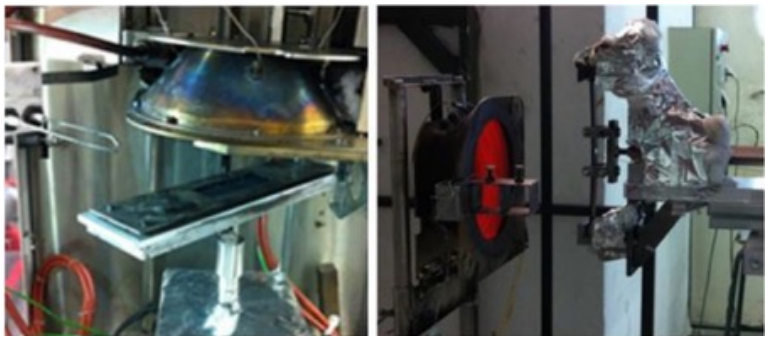


Figure: cone calorimeter tests, without (left) and with (right) mechanical load

Large scale Fires in collaboration with the Fire rescue of the SDIS 49

Institut Pprime, Université de Poitiers, CNRS, Duorisk, LEMTA, Efectis France and SDIS 49 have realized two large scale experimental characterizations of fires in real building configurations:

- The first campaign has been done in march 2022 and was dedicated to the propagation of a fire to other solid fuels located respectively at 50cm, 100cm, 150cm and 250cm from a calibrated wood crib fire. The different combustible targets were instrumented from thermocouples and fluxmeters in order to determine their thermal conditions and the conditions of their ignition.
- The second campaign, done in June 2022 was focused on the thermal stresses experienced by firefighters in actual operations. A calibrated fire was positioned into a room and the firemen simulated a typical intervention as it would face a real fire. They also test different conditions of extinction. During these tests, in addition to instrumentation to characterize the fire as such, the firefighters' suits were specifically instrumented.

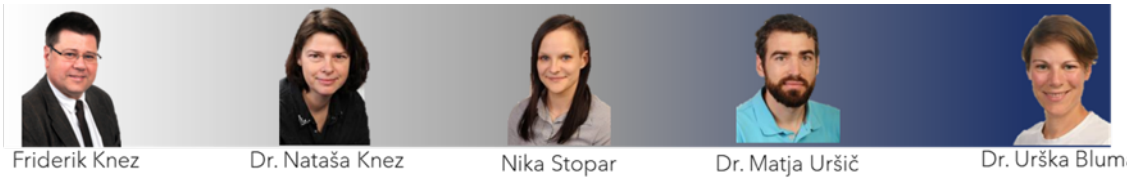
Signed: Thomas Rogaume, University of Poitiers

News from ZAG – The Slovenian National Building and Civil Engineering Institute

Official opening of the Fire Lab!

ZAG has been dealing with fire engineering and testing for almost 50 years and on the 2nd of September, we had the opening of the New Fire lab in Logatec. It is one of the largest facilities of its kind in this part of Europe. The new Fire Laboratory will ensure further development, spatial capacity and scientific excellence in the fire field where the FRISSBE project, acquired last year from the EU Horizon 2020 program, also plays an important role in the laboratory's future. "*The goal is to transfer advanced solutions into practice*", said doc. dr. Aleš Žnidarič, director of ZAG.

Team Members and research activity



Head of the Fire Lab

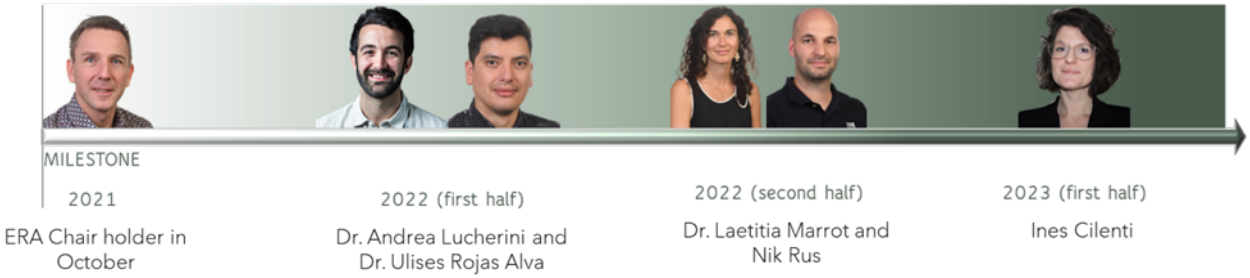
The Fire Lab and Fire Engineering department consists of 12 members and five of them, Friderik Knez, dr. Nataša Knez, dr. Urška Blumauer, Nika Stopar and dr. Matija Uršič, are involved in research activities. The fire lab is engaged in research for industry as well as collaborations with national and international research institutions and other ZAG departments. The subjects of research are, among others, the development of various materials, testing equipment and the experimental testing of prototype products. Currently, highly relevant research topics include performing fire tests of composite timber beams made of cement-particle boards and investigating reaction to fire of the ballast track containing recycled rubber.

FRISSBE project

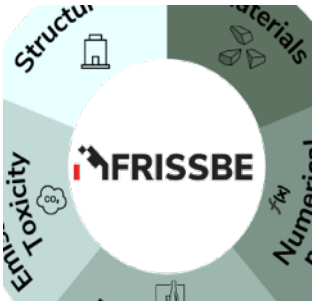
The FRISSBE project (Fire-safe Sustainable Built Environment) is an ERA chair project funded by the European Commission and was established by ZAG with the intent of enhancing the research side of fire safety engineering aspects at ZAG. More info about the project can be found in the Grant agreement ID: 952395. The team is part of a strong interactive ecosystem with the InnoRenew CoE and the University of Primorska, as well as with other supporters of the project. The project's aims are regional impacts in terms of research, education, and improvement of engineering practice in fire safety science.

Establishment of the FRISSBE team

After Prof Grunde Jomaas was appointed as the ERA Chair holder in October 2021, Dr Andrea Lucherini and Dr Ulises Rojas Alva joined the FRISSBE project as senior researchers at the beginning of 2022. In the second half of the year, the team kept on growing. Dr Laetitia Marrot joined as a senior researcher and Nik Rus as a PhD student. In January 2023, a new member joined, the PhD student Ines Cilenti.



Research focus



The FRISSBE team's research work is spanning a vast array of topics which are thoughtfully arranged in a concise matter in the presented infographic. A more detailed overview of the specific research areas and how they tie in with the Sustainable Development Goals proposed by the United Nations is available on the website.

Dr. Laetitia Marrot is a senior researcher within the FRISSBE project. Her main interest is to develop environmentally friendly materials to reduce our dependence on hydrocarbon-based resources. Her expertise spans plant fibers, polymeric and cementitious composites reinforced by natural fibers, biocarbon, smart textiles and sustainable coatings. Within the FRISSBE project, she researches innovative ways to increase the fire performance of sustainable bio-based materials.

Nik Rus is the first PhD student to join the FRISSBE team and is currently working and studying to complete his PhD in the Renewable Materials for Healthy Built Environments program at the University of Primorska. His research work is focused on the increased fire risk that occurs when buildings are retrofitted with PV installations on roofs and the effects that different setups, materials and configurations have on the fire spread and dynamics when fires come into proximity of such installations. His work is aimed at a better understanding of the influences of fire behavior which will lead to the proposal of solutions for the mitigation of the imposed risks.

Ines Cilenti is also a PhD student in the FRISSBE team. Her expertise includes fluid dynamic models both for smoke and heat control and evacuation for a wide range of buildings from the industrial plan up to offices, museums, stadiums and in rail tunnelling. The aim of her research at FRISSBE, is to understand the development of a fire in a wooden compartment, and the effects of the boundary conditions on the fire spread inside and outside the compartment itself, and on the decay phase. The scope of the study is the contribution to the conceptualization of a performance-based design methodology.

Dr. Andrea Lucherini and Dr. Ulises Rojas Alva are senior researchers in the FRISSBE project that joined the team in the first half of 2022.
Dr. Rojas Alva is focusing on the fire safety of batteries along with participating in some interesting and impactful projects related to spacecraft fire safety. Worthy of mention is also his collaborations with InnoRenew's researchers regarding the performance of differently treated wood samples and a project in collaboration with the army.

Dr. Lucherini is currently leading research projects on fire dynamics of post-flashover compartment fire for performance-based fire safety engineering, heat transfer and structural mechanics of modern sustainable construction materials during and after a fire with a particular focus on engineering wood products (e.g., glulam,

CLT, and composite timber girders), and advanced experimental hybrid methodologies for fire testing (radiant panels).

More info about the expertise and backgrounds of FRISSBE team members can be found on the website.

Opportunities within FRISSBE

In 2023, the FRISSBE team is planning to again hire at different levels – senior researchers, post-docs and PhDs. The information about open positions within the FRISSBE project can be always found on the project website. We also encourage you to follow us on LinkedIn and on Twitter for updates about the team activities and research outputs. Stay Tuned!

Events

In the year 2022, there was already a plethora of different events that the FRISSBE team actively participated in and here we highlight the most prominent ones that occurred after the publication of the last year's IAFSS Newsletter.

International workshops and seminars held by the FRISSBE team






Focussing on experimental measuring techniques in fire science on the premises of the new fire laboratory. We hosted a group of fire safety researchers from Western Norway University of Applied Sciences (HVL), Norway. We were also joined by a group of researchers from the **University Centre for Energy Efficient Buildings from Czech Technical University in Prague**.

Fire Takes no vacation! Prof. José **Torero** talked about fire safety challenges in modern and sustainable built environments. Prof. Grunde **Jomaas** focused on the fire safety of photovoltaic systems on buildings. Friderik **Knez** presented some of the outstanding capacities of the new fire laboratory of ZAG in Logatec

Sustainability in fire research! The event was attended by renowned **experts from 8 countries**, who, as representatives of various educational and research organizations, also contributed with their knowledge and experience. Discussions were led by Prof. José **Torero**, Prof. Grunde **Jomaas** and Friderik **Knez.**

Conference attendance and contribution

Dr. Andrea **Lucherini** and Dr. Ulises **Rojas Alva** presented their work and view on the currently pressing matters in fire safety at the International Conference: »Safety and Prevention 2022. Andrea's presentation was entitled **Structural fire safety challenges in timber buildings** and focused on explaining how to address the fire safety of buildings that use wood as a structural element and what are the obstacles that this area is currently facing. **Managing fire risks associated with lithium-ion batteries in the built environment** was the title of Ulises' presentation and it presented the listeners with a wide range of risks introduced to people and the built environment by the abundant use of Li-ion batteries. Grunde **Jomaas** contributed his fair share, as he was invited by the Congress and expo's organizing committee to give a talk on Spacecraft Fire Safety during the gala dinner.

SAVE THE DATE

On **November 29-30, 2023** we are going to host an International Symposium on Fire Safety and Sustainable Built Environment in Ljubljana. Further details will soon be available on our website and on LinkedIn. We do hope to see many of you there.

Signed: Ines Cilenti, Slovenian National Building and Civil Engineering Institute (ZAG)

News from University of Sheffield

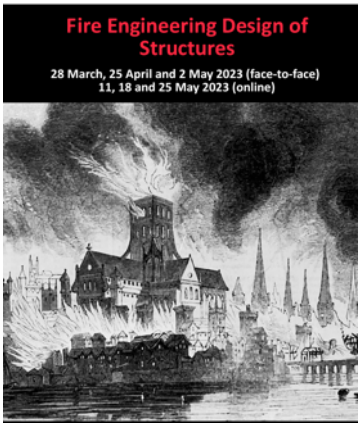
New arrivals

In September 2022, **Aatish Jeebodh**, originally from Mauritius, started his PhD entitled "*Sustainable steel-timber hybrid structures in fire*" under the supervision of Dr Shan-Shan Huang, Prof Buick Davison, Prof Ian Burgess, Dr Martyn S McLaggan and Dr Danny Hopkin. His project is focused on the thermo-mechanical modelling of steel framed buildings with cross-laminated timber floors under fire exposure using non-linear finite element analysis, with the aim to develop a better understanding of the fire performance of such systems. He received distinction in MSc Structural Engineering from the University of Sheffield, where he was also awarded the MSc achievement prize. He is also a Registered Professional Engineer in his home country, where he acquired experience working as a Civil/Structural Engineer in multi-disciplinary environments, multinational teams and collaborating with different construction stakeholders to achieve project deliverables.

Dr **Xiang Yun** joined the University of Sheffield as a Lecturer of Structural Engineering in August 2022. Prior to joining the team, he has worked as a Research Associate at Imperial College London and a visiting scholar at Johns Hopkins University. His research interests include high strength steel structures, aluminium alloy structures, stainless steel structures, structural stability and structural fire engineering. He has published over 30 peer-reviewed journal and conference papers in the field of Structural Engineering. His recent paper titled "*Benchmark tests on high strength steel frames*" was awarded the Best Paper of the Year 2022 in Engineering Structures. He is an editorial panel member of an international journal Frontiers in Built Environment and a BSI committee member (B/525/9), working predominantly on the development of design guidelines and specifications for the structural Eurocodes.

Fire Safety Design for Structures Course

The course will be of use to structural engineers, building control authorities and others involved in ensuring fire resistance of buildings. It will be of use to those who wish to understand the background and principles of structural fire engineering, particularly in the context of the considerable advances in the state of the art which have taken place over the past two decades.



The course will be delivered both face-to-face in Sheffield and virtually through remote access.

Download the 2023 course leaflet (PDF, 774KB), which gives details of how to register and registration fees.

Registration is now open, via the University's Online Store.

Signed: Martyn McLaggan, University of Sheffield.

News from the Fire Protection Research Foundation (FPRF)

Fire Protection Research Foundation (FPRF) receives grant funding for four projects, serving in advisory role for five additional grants - The Fire Protection Research Foundation, the research affiliate of the National Fire Protection Association® (NFPA®), has received grant funding for four projects, including two funded by the Federal Emergency Management Agency Assistance to Firefighters Grants (FEMA AFG) and two funded by the National Institute of Standards and Technology (NIST). In addition, FPRF will serve in an advisory service capacity for five additional grants, including three with FEMA AFG, one with the U.S. Department of Transportation (DOT), and one through the National Aeronautics and Space Administration (NASA). Read more here about the summary of the newly grant-funded FPRF research projects.

2022 Suppression, Detection and Signaling Research and Applications conference (SUPDET® 2022) presentations published – 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 2022 conference was held on September 13-16, 2022, in Atlanta, Georgia (USA). The 2022 conference abstracts and presentations are available from here.

SAVE THE DATE for the 2023 Suppression, Detection and Signaling Research and Applications conference (SUPDET® 2023) – is scheduled for September 12-14, 2023 in Northbrook, IL (USA). The call for papers is

available here: https://www.nfpa.org/News-and-Research/Resources/Fire-Protection-Research-Foundation/SUPDET

Notice of recent FPRF research reports

- ***Economic Impact of Fire: Cost and Impact of Fire Protection in Buildings –*** The objective of the work is to establish and apply a methodology for evaluating the total benefits and costs related to fire protection features in buildings. Download report here.
- ***Carbon Monoxide Incidents: A Review of the Data Landscape –*** This report provides the carbon monoxide incident data landscape to clarify the sources of information, how the data is compiled and present what the data represents. Additionally, this research identifies, summarizes, and analyzes case studies of non-fire carbon monoxide incidents specific to commercial-type occupancies. Download report here.
- ***A Review of Dynamic Directional Exit Signage: Challenges and Perspectives -*** As buildings egress layouts become more complex, technology advances, and building hazards requiring rapid egress extend beyond fire, opportunities for dynamic exit signage is increasing. This study summarizes the state of dynamic exit signage and the challenges and opportunities ahead. Download report here.
- ***An Analysis of Public Safety Call Answering and Event Processing Times –*** This report analyzes and summarizes the call answer and processing time interval data in response to fire and EMS events (excluding law enforcement data) from a wide spectrum of Public Safety Answering Point (PSAPs) dispatch centers (large, small, urban, rural etc.) in the United States. Download report here.

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

Signed: Jacqueline R. Wilmot, P.E., Fire Protection Research Foundation

News from OFR Consultants

OFR continue to fund Antonela Čolić to pursue her PhD supervised by Prof. Luke Bisby at the University of Edinburgh examining the performance of adhesives used in the manufacture of CLT panels. We also have our on-going sponsorship of Aatish JEEBODH supervised by Dr Shan-Shan Huang at Sheffield University on their work on sustainable steel-timber hybrid structures in fire. OFR are also partnering with Dr Peter Lawrence and Dr Asim Siddiqui at the University of Greenwich to support a PhD on BIM standards within fire engineering. Finally, the University of Central Lancashire (UClan) have a new PhD scholarship on evacuation from high-rise residential buildings in which Mike Spearpoint will be a co-supervisor.

Mike Spearpoint represented the Institution of Fire Engineers (IFE) on the accreditation panel of the fire engineering programme at the University of Ulster. It is likely Mike will take part in future accreditations of other institutions as the opportunity arises.

OFR's involvement with the Structural Timber Association (STA) supporting best practice for fire safety when constructing with mass timber has almost come to an end, although there may be additional work in the pipeline. Other areas of recent research collaboration include work on water mist systems and our continued interest in fire safety in parking buildings, to name a couple. Members of OFR continue to publish papers at conferences and in journals and there is 'Lab' on ResearchGate that collates much of the research output.

Finally, in addition to OFR being a funding partner of the IMFSE programme, OFR are also delighted to be the key sponsor of the Fire Science Show hosted by Wojciech Węgrzyński. The sponsorship allows Wojciech to continue to deliver interesting and informative discussions on a broad range of fire science and engineering topics.

Signed: Michael Spearpoint, OFR Consultants

News from Society of Fire Protection Engineers (SFPE)

2ND EDITION OF *SFPE ENGINEERING GUIDE TO FIRE RISK ASSESSMENT* HAS ARRIVED

SFPE recently published the 2nd edition of its *Engineering Guide to Fire Risk Assessment*. In 2006, SFPE published the first edition of the *SFPE Guide to Fire Risk Assessment*. This guide became a popular resource, providing a concise overview and summary of various topics that an engineer who is asked to conduct a fire risk assessment as part of a fire engineering design should consider. Specifically, the purpose of this document was to guide the use of risk assessment methodologies in the design and assessment of fire safety for a building, facility, or process.

Research and practical experience related to fire risk assessment have advanced substantially over the subsequent decade. SFPE has monitored this progress, and the SFPE Task Group on Fire Risk Assessment has developed and extended the guide, resulting in the 2022 *SFPE Engineering Guide to Fire Risk Assessment*, 2nd Edition. The SFPE Task Group developed this edition of the guide with significant and extensive global input from individuals with expertise in risk assessment. It builds on the topics in the first edition and covers additional subjects, including:

- Risk perception
- F-N curves
- Risk communication
- Residual risk management
- Risk monitoring
- Sensitivity analysis

The revised guide also includes a new flowchart (Figure 1) that provides a general overview of the fire risk assessment process.

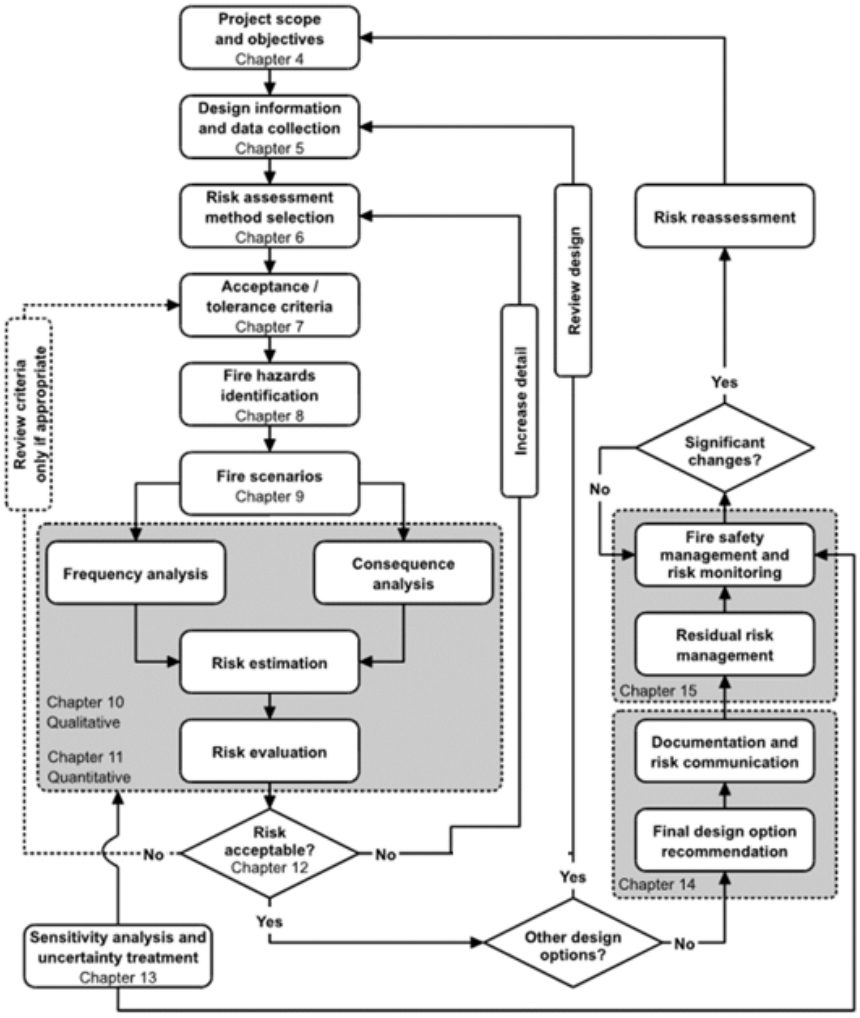


Figure 1. Phases of a Fire Risk Assessment

The process depicted in the figure is intended to cover four distinct phases of a fire risk assessment:

- **Phase 1 — Planning.** The first four activities are associated with the planning phase of a fire risk assessment. These activities are intended to define the scope and objectives clearly, collect the information necessary to perform the analysis, identify the risk assessment methods to be used and define the acceptance or tolerance criteria governing the process.
- **Phase 2 — Execution.** The risk assessment proceeds with the technical work, including hazards analysis, definition, and characterization of the scenarios and the risk evaluation. This part of the execution phase is referred to in this guide as "risk assessment."
- **Phase 3 — Risk Communication.** Once the risk evaluation process is completed, the next phase in the process is risk communication.
- **Phase 4 — In-Service (Chapter 15):** Residual risk management and monitoring is the fourth and final phase. In this phase, the assumptions and conditions governing the risk are identified and monitored throughout the facility's operational life to identify configurations associated with risk increases that may not be mitigated.

The Guide also uses examples that reinforce topics discussed in the guide. This includes a conceptual example following the guidance presented in the guide. The example consists of developing a simplified fire risk assessment for a computing facility that guides the reader through each step in the fire risk assessment process.

Signed: Chris Jelenewicz, PE, FSFPE, SFPE Chief Engineer

PUBLICATION NEWS FROM MEMBERS

New Section on Wildland-Urban Interface (WUI) Fires added to upcoming 6th Edition of SFPE Handbook

At the invitation of the Society of Fire Protection Engineers (SFPE), Samuel L. Manzello and Sayaka Suzuki served as section editor, and deputy section editor, respectively, of an all-new section focused on Wildland-Urban Interface (WUI) fires. It marks the first time that WUI fires have been added to the handbook in a comprehensive manner. Please look for these exciting chapters when the 6th Edition is released later this year.

- Rapahele Blanchi and Alessio Arena, Overview of Wildland-Urban Interface (WUI) Fires
- Steve Gwynne, Erica Kuligowski, and Tara McGee, Evacuation and Emergency Management in Wildland-Urban Interface (WUI Fires
- Eric Guillaume, Environmental and Health Issues from Wildland fires and Wildland-Urban Interface (WUI) Fires
- Savannah Weisses and Ofodike A. Ezekoye, Exposure Threats to Structures in the Wildland-Urban Interface (WUI)
- Sayaka Suzuki and Samuel L. Manzello, Structure Ignition Vulnerabilities in Wildland-Urban Interface (WUI) Fires
- Chris Lautenberger, Maria Theodori, and Delany Seeburger, Modeling of Wildland Fires and Wildland-Urban Interface (WUI) Fires
- William Siembieda, and Molley Mowrey, Urban and Land Use Planning

Invited Paper to Horizons in Mechanical Engineering in the Journal *Frontiers in Mechanical Engineering*

At the invitation of a journal *Frontiers in Mechanical Engineering*, Samuel L. Manzello and Sayaka Suzuki prepared a review paper on the needs for engineers to better engage in fire safety science. Due to the complex nature of the large outdoor fire problem, a multidisciplinary approach is needed, and engineers are required to play an important role. The paper is open access and is entitled: The World is Burning: What exactly are firebrands and why should anyone care? Please feel free to download the paper free of charge at https://doi.org/10.3389/fmech.2022.1072214

Signed Samuel L. Manzello, Reax Engineering and Sayaka Suzuki, NRIFD

UPCOMING CONFERENCES

3rd International Symposium on Lithium Battery Fire Safety (3rd ISLBFS) – 25-28 August 2023, Qingdao (China)

The 3rd International Symposium on Lithium Battery Fire Safety (3rd ISLBFS) will be hosted by the University of Science and Technology of China and China University of Petroleum (East China), from 25 to 28 August 2023, in Qingdao, China. It aims to provide an opportunity for scholars and others interested in fire safety science of lithium-based batteries to discuss and share knowledge.

It is with great pleasure to invite you to submit an Extended Abstract first (the Submission website: https://easychair.org/conferences/?conf=3rdislbfs); the Abstract Submission Deadline is 31 March 2023. Some selected papers presented will be invited by the Guest Editors to submit to the special issue of *Process Safety and Environmental Protection* or *Fire Technology* for peer review. The topic areas include, but are not limited to:

- Heat generation of lithium-based battery
- Thermal management for lithium-based battery
- Fire and explosive dynamics of lithium-based battery
- Fire assessment in production, transportation, storage and usage
- Gas generation of lithium-based battery
- Thermal runaway and propagation of lithium-based batteries
- Fire detection and suppression of lithium-based battery
- Safer materials for lithium-based battery

We sincerely welcome you to attend the symposium to discuss ideas and share knowledge. You can visit the webpage (https://liionfire.cn/) to get more information about the symposium.

The 1st and 2nd International Symposium on Lithium Battery Fire Safety were hosted by the University of Science and Technology of China (Hefei, China) and had got great success with the help of colleagues. The following link is the news report:

http://en.sklfs.ustc.edu.cn/2020/0109/c5778a411476/page.htm
https://safetyse.ustc.edu.cn/2021/1124/c4555a535866/page.htm

Suppression, Detection and Signaling Research and Applications conference (SUPDET® 2023) – 12-14 September 2023, Northbrook, IL (USA)

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 research and development on techniques used for fire suppression, detection, and signaling. These events are generally attended by a variety of fire protection professionals, such as engineers, researchers, insurers, designers, manufacturers, installers, and AHJs. The conference will be held September 12-14, 2023 in Northbrook IL (USA).

Links to the conference program and registration information can be found at:
https://www.nfpa.org/News-and-Research/Resources/Fire-Protection-Research-Foundation/SUPDET

3rd International Conference on Loss Prevention, Process Safety, and Thermal Analysis in Chemical and Coal Industries (3rd LPPSTA) - 17-19 November 2023, Hefei (China)

The 3rd International Conference on Loss Prevention, Process Safety, and Thermal Analysis in Chemical and Coal Industries (3rd LPPSTA) will be hosted in Hefei, China, from 17 to 19 November, 2023. The organizers of the 3rd LPPSTA include University of Science and Technology of China, Xi'an University of Science and Technology, Yunlin University of Science and Technology and Nanjing Tech University. It is aimed to provide an opportunity for scholars and others who are interested in chemical process safety, new energy fire safety, fire technology, etc. to meet together and discuss and share knowledge.

You can visit the webpage (https://lppsta3rd.casconf.cn/) to get more information about the conference. Some selected papers presented will be invited by the Guested Editors to submit to the special issue of Safety Science or Journal of Loss Prevention in the Process Industries for peer review. The topic areas include, but not limited to:

- Chemical process safety
- New Energy Fire Safety
- Coal Fire Disaster Prevention and Control
- Mine Ventilation and Gas Management
- Fire Science and Fire Technology
- Urban Public Safety
- Disaster Emergency Response
- Safety and Emergency Management

We sincerely welcome you to attend the conference to discuss ideas and share knowledge.

The past two LPPSTA were successfully held. More than 200 delegates from the United States, Canada, France, Japan, Korea, Italy, Hungary, China, and other countries and regions attended the conference for academic communication, which greatly promoted the development of the research filed of industrial process safety, emergency management, the development of theory and technology in prevention and control of coal fire hazards. On the following link you will find the news reports: https://lppsta.scievent.com/

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

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, with the participation of the International Association of Fire Safety Science (IAFSS). 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 the world's top fire science researchers.

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

The conference website and instructions for paper submittals will be available in the next IAFSS newsletter or check the IAFSS website.

CALLS FOR PAPERS/ABSTRACTS/POSTERS

14th International Symposium on Fire Safety Science (IAFSS2023)

The 14th International Symposium on Fire Safety Science (IAFSS2023) will be held October 22 - 27, 2023 in Tsukuba, Japan. The Call for Posters and Images will be open until June 30, 2023. (The Call for Papers closed in February.)

Full details can be found on Page 6 of this newsletter and at https://iafss2023.com/pdf/iafss-images-2022-23-v5.pdf and https://iafss2023.com/pdf/iafss-posters-2022-23-v4.pdf.

UPCOMING EVENTS – 2023-2024

2023

Mar 29 - 30	SFPE European Conference on Fire Safety Engineering – Berlin (Germany) - https://www.sfpe.org/europe23/home
Apr 24-25	International Conference on Fires in Vehicles (FIVE 2023) – Stavanger (Norway) - https://www.ri.se/en/five/about-five
Apr 26-28	10th International Symposium on Tunnel Safety and Security (ISTSS 2023) – Stavanger (Norway) - https://www.ri.se/en/istss/about-istss/
Sep 12-14	Suppression, Detection and Signaling Research and Applications conference (SUPDET® 2023) – Northbrook, IL (USA) - https://www.nfpa.org/News-and-Research/Resources/Fire-Protection-Research-Foundation/SUPDET
Oct 22-27	14th International Symposium on Fire Safety Science (IAFSS2023) – Tsukuba (Japan) - https://iafss2023.com/

2024

Oct 9-11	4th European Symposium on Fire Safety Science (EFSS 2024) - Barcelona (Spain) Watch for the link to the conference website in the coming months.

JOB POSTINGS

The **University of Greenwich (UK)** is accepting applications for a PhD position for a project entitled "A Building Information Modelling based Digital Workflow for Fire Safety Engineering". The closing date for applications is 15 March 2023. For details, see https://docs.gre.ac.uk/__data/assets/pdf_file/0025/307618/vcs-fes-05-22-web-advert-updated.pdf.

You can always find current job postings on the IAFSS website – www.iafss.org.

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 Editor (Rita Fahy, rfahy2@yahoo.com).

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

For the next issue (No. 50), the deadline for submissions is August 15, 2023.

http://www.iafss.org

2021-2023
TRUSTEES AND COUNCIL MEMBERS OF THE IAFSS

EXECUTIVE COMMITTEE/TRUSTEES
Chair:
Dr Brian Meacham, USA
brian@meachamassociates.com

Honorary Treasurer/Vice Chair:
Prof Margaret Simonson McNamee, Sweden

Honorary Secretary/Vice Chair:
Prof Charles Fleischmann, New Zealand

Vice-Chairs:
Prof Ritsu Dobashi, Japan
Dr Jason Floyd, USA
Prof Longhua Hu, China
Prof Elizabeth Weckman, Canada
Prof Jennifer Wen, UK

Immediate Past Chair:
Prof Patrick van Hees, Sweden

MEMBERSHIP ADVISORY COUNCIL (MAC):
Prof Luke Bisby, UK
Prof Pascal Boulet, France
Prof W-K Chow, Hong Kong, China
Prof Ritsu Dobashi, Japan
Dr Rita Fahy, USA
Prof Charles Fleischmann, New Zealand
Dr Jason Floyd, USA
Prof Edwin Galea, UK
Prof Michael Gollner, USA
Prof Kazunori Harada, Japan
Prof Longhua Hu, China
Prof Brian Lattimer, USA
Prof Naian Liu, China
Prof Cristian Maluk, Australia
Prof Ken Matsuyama, Japan
Prof Margaret Simonson McNamee, Sweden
Dr Brian Meacham, USA
Prof Bart Merci, Belgium
Prof Yuji Nakamura, Japan
Prof Arnaud Trouvé, USA
Prof Patrick van Hees, Sweden
Dr Yi Wang, USA
Prof Elizabeth Weckman, Canada
Prof Jennifer Wen, UK