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Grand Challenges Initiative

Building a Strategy for Fire Engineering Research & Education in a Changing World

Hosted by the SFPE Foundation

Motivation:

The [SFPE Foundation](https://www.sfpe.org/foundation) facilitates research and education that advances the scientific understanding of fire in the natural and built environments. Our investments and activities are guided by the knowledge gaps in fire safety science and engineering identified in the [SFPE Research Roadmap](#), a document produced through SFPE member and stakeholder consultations and published in 2017. The Research Roadmap identifies nine horizontal topical research threads (e.g., Human Behavior, Building Fires, Sustainability/Resilience, etc.) and four vertical tools, applications, and methods (e.g., Data, Design Tools, etc.) where additional research and educational development is needed to advance the profession and enable fire-safe communities around the world. The challenge with the current edition of the Research Roadmap is that it does not provide a comprehensive strategy or timeline for *which* topics, data, tools, or models to prioritize (and in what order) to enable coordinated progression for maximum impact. Moreover, it does not say enough about the challenges that exist to reaching these strategic milestones. We need to understand the potential technical and jurisdictional challenges; take account of the workforce development, training, and certification that may need to be created, promoted, or enforced; plan for public education initiatives; and develop strategic partnerships with other organizations to advance these efforts.

To do this, we need to draw on the collective creativity and real-world experience of our SFPE networks and partners to envision how fire safety science and engineering can contribute to tackling the grand, global challenges that communities face around the world. By looking to the future, and understanding our present, we can begin to map out the path forward from where we are now to where we want to be in 5, 10, 20 years, and beyond.

Proposal:

The SFPE Foundation seeks industry, academic, government, non-profit, and other partners to invest in a multi-year research and educational collaboration to develop a **strategy for action**. Together, we will leverage the collective expertise of our networks to identify how fire safety science and engineering can contribute to addressing pressing challenges in globally salient areas like **cybersecurity, digitalization and artificial intelligence, climate change and resilience, energy and infrastructure transition, and more**. This “Grand Challenges Initiative” will begin with a year of events, workshops, working group development, and white paper production aimed at identifying the role of fire safety science and engineering in tackling grand challenges our world faces, what our field can contribute, and how we can prepare ourselves to breakdown industry and sectoral silos and ensure a seat at the table when our expertise is relevant.

Approach:

While we will use the existing Research Roadmap as a guide and key reference document, our approach with the Grand Challenges Initiative is to begin with topics that are not unique to fire engineering, but instead represent pressing global challenges where fire safety science and engineering can contribute to ongoing



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discussions that affect the daily lives of billions. We expect these topics to include things like “Cybersecurity,” “Digitalization and Artificial Intelligence,” “Climate Change and Resilience,” “Sustainability,” or similar high-level topics. Rather than selecting these unilaterally, the SFPE Foundation will poll members of the SFPE community and other stakeholders to solicit input. We will then select four topics based on crowd-sourced responses to populate the four half-day sessions that will constitute our virtual **“Grand Challenges Summit”** scheduled for **April 26 – 28, 2022**. Interested participants can access additional material on our [website](#).

At the 2022 Grand Challenges Summit, these four topics will be the lens through which we address questions like:

- Where is fire safety science and engineering relevant to each of these topics?
- How can we envision our field contributing to solving challenges in these areas over the next 5, 10, and 20 years? Where are the near, immediate, and long-term opportunities?
- What do we know already? What tools are working well? Where do certifications, credentialing, and training exist to support these tools and knowledge?
- Where are the research knowledge gaps? What type of research is needed? Where are better models and tools needed? In what order do we need to build these competencies and invest in these gaps to create a narrative arc that supports coordinated advancement over time?
- Where is coordination, communication, dissemination, or other support needed to overcome existing (or anticipated future) barriers to producing knowledge that is useful? Where are the potential bottlenecks?
- Where do we need to plan for workforce development, credentialing, certification, handbooks or guides, or other training support for professionals in our field? Where do we need to plan for public education and outreach? How do we make sure all are included and that we have equity in access to the necessary resources?
- What resources exist to support the work identified above?
- What organizations could be potential partners to facilitate these projects in various ways?

The Summit is intended to be a moderated, working meeting, relying heavily on the participation and input of attendees and their expertise across the focus areas. After the Summit concludes, the SFPE Foundation will facilitate the formation of volunteer Working Groups centered around each topic. These Working Groups will convene with SFPE Foundation support to complete white paper drafts for initial presentation at the SFPE Annual Conference & Expo in October 2022. Pending sufficient support, the Working Groups will continue developing their white papers for publication by mid-2023, with preliminary presentations at the anticipated 2023 Grand Challenges Summit. Once the white papers are completed, the SFPE Foundation anticipates hosting follow-on sessions with stakeholders to disseminate the findings and explore the potential for collaboration among Grand Challenge Initiative partners and other relevant parties to implement the strategic roadmap identified by the Working Group teams, most likely starting in late 2023 and continuing through 2024.

In keeping with our commitment to supporting the next generation of fire engineering professionals, we intend to involve advanced graduate students in the initiative through the creation of the Student Research Fellow position. Each of the four Working Groups will be supported by a Student Research Fellow. These individuals will be selected by the Foundation through a competitive process where their demonstrated interest and experience in the topic under discussion will be an essential qualifying credential for acceptance to the program. These Student Research Fellows will support the program in their specific topic area at least from the April 2022 Grand Challenges Summit through white paper publication in mid-2023. Each will receive a stipend in exchange for providing notetaking, research, and white paper development support for their topic. They will

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be supervised by SFPE Foundation staff and work in coordination with Working Group chairs to support their specific Working Group assignment. These Fellows will have the opportunity to co-present (with their Working Group chair) the work of their assigned group at the SFPE Annual Conference & Expo in Detroit in October 2022. They will also help facilitate a working session at the SFPE Annual Conference & Expo where attendees will have the opportunity to provide direct input and feedback to the work completed so far.

Expected Outputs & Outcomes:

- Working Groups for each of the four areas will create a “Roadmap” for their topic in the form of a white paper.
- White papers will identify action items and recommended timelines in the areas of research, education, and coordination to support implementation.
- SFPE Foundation will support the public dissemination of this work to the extent possible and appropriate, perhaps to include publication in industry journals or magazines, presentation at other conferences, and via webinars hosted through the Foundation.
- Pending the findings in the white papers, the SFPE Foundation will facilitate discussions centered on identifying opportunities for collaboration among Grand Challenge Initiative partners and other relevant stakeholders to help implement the strategic roadmap.
- These recommendations may inform planning at SFPE & SFPE Foundation with respect to credentialing and training, continuing professional development, guides and standards, and other relevant initiatives.
- SFPE Foundation may use these insights to direct Foundation funding in line with the SFPE Research Roadmap.
- SFPE Foundation may use these insights to pursue research and educational partnerships with other interested organizations. This may include pursuing new external grant and funding opportunities to support research projects and educational initiatives at scale.
- All Grand Challenge Initiative partners are strongly encouraged to adopt and utilize the insights from this collective, collaborative endeavor to inform their own planning and programmatic activities, assuming proper attribution to the source material.

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Anticipated Timeline:

- October 2021 – April 2022
 - Identify founding partners to join the Grand Challenges Initiative.
- January 2022
 - Identify four topic areas for the Summit sessions.
 - Open registration for Summit attendees.
 - Open application portal for featured speakers, case study panels, and session moderators.
- February 2022 – March 2022
 - Solicit applications for Student Research Fellows; select and onboard recipients.
 - Finalize program by mid-March.
- April 26 – 28, 2022
 - Virtual “Grand Challenges Summit” event
 - Four half-day sessions, each focused on an emerging global topic where fire safety science and engineering expertise is needed.
 - Goal is to visualize what role FPEs can and should play in these topical areas, addressing these Grand Challenges, and then work backwards to fill in the gaps as to what needs to happen to get there.
- May 2022
 - Student Research Fellow initial summary reports due to SFPE Foundation staff.
- June 2022
 - Reports circulated and volunteer Working Groups formed in relevant topic areas; Students stay with their topic area unless a change is needed
- July – September 2022
 - Working Groups meet and map out the strategy in greater depth for their assigned topic area; supported by Student Research Fellows.
- October 12 – 14, 2022
 - SFPE Annual Conference & Expo, featuring breakout track or dedicated day of sessions on white paper topics generated by the meetings earlier in the year; feedback and discussion with attendees.
- May 2023
 - Tentative date for 2023 Grand Challenges Summit
 - Presentation of white paper findings and working group discussions to evaluate content and identify next steps.
- June – July 2023
 - White papers published by SFPE Foundation.
 - Webinars produced by SFPE Foundation highlighting white paper findings.
- September 2023 – December 2024
 - Collaboration and matchmaking meetings involving Grand Challenge Initiative partners and other relevant stakeholders.

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Join Us:

We seek industry, academic, government, non-profit, and other partners to invest in this multi-year research and educational collaboration to help define the future of fire engineering. Together, we'll benefit from peer-to-peer learning and collaboration that will leverage our collective knowledge and strengths, propelling us forward in a more efficient, expedient way than any of us could manage alone. To support the work outlined above, we need partners who are committed to active participation in the Grand Challenges Initiative, as well as partners who can contribute to helping cover the costs associated with such an important undertaking. We also recognize that different entities will be able to contribute in different ways.

To that end, we've developed the following options* for joining the SFPE Foundation Grand Challenges Initiative as a Founding Partner (in US Dollars):

GCI Founding Partner (Industry, Corporations, Foundations, Individual Donors)

- ☐ Luminary Level – \$15,000+
- ☐ Platinum Level – \$10,000
- ☐ Gold Level – \$5,000
- ☐ Silver Level – \$2,500

GCI Founding Partner (Non-Profit or Not-for-Profit)

- ☐ Luminary – \$10,000+
- ☐ Platinum – \$5,000 (rec'd based on annual operating budget >\$3 million)
- ☐ Gold Level – \$2,500 (rec'd based on annual operating budget \$1-3 million)
- ☐ Silver Level – \$1,000 (rec'd based on annual operating budget <\$1 million)

Academics are invited to join the Grand Challenges Initiative at the appropriate Department- or University-level at no cost. Please contact SFPE Foundation Director Leslie Marshall (foundation@sfpe.org) for more information on what is required. Individual academics are encouraged to participate as well at no cost. You may register to attend the Summit, volunteer on the Working Groups, or otherwise participate as an individual provided you have relevant expertise in a topic area.

Government agencies or government-affiliated entities are encouraged to participate in the Grand Challenges Initiative. Please contact SFPE Foundation Director Leslie Marshall (foundation@sfpe.org) to discuss.

*If the joining fee is prohibitive for your organization and you would still like to participate in the initiative, please contact the SFPE Foundation Director, Leslie Marshall, to discuss.

GCI Founding Partners engage by:

- Having at least one representative attend the 2022 Grand Challenges Summit.
- Participating in or otherwise support at least one of the Working Groups.
- Helping publicize this effort and its outputs as those become available.
- Providing your logo or other organizational information to help the SFPE Foundation amplify your participation in the Initiative.
- Helping identify other potential partners or collaborators to involve in the Initiative.



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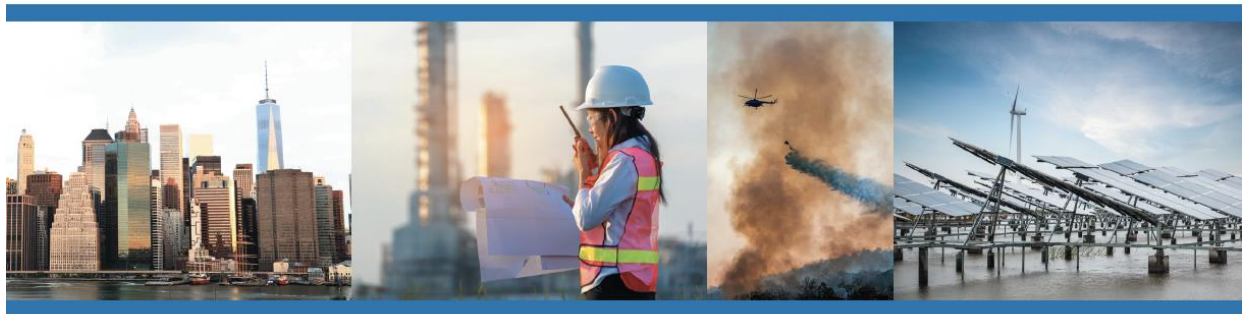
GCI Founding Partners benefit from engagement through:

- Public acknowledgement of their status as a Grand Challenges Initiative Founding Partner on the SFPE Foundation website, in the marketing materials for the Grand Challenges Summit, and in other published materials related to the Initiative, such as white papers.
- Priority in terms of opportunities to present or moderate at the 2022 Grand Challenges Summit.
- Priority in terms of opportunities to serve on the Working Groups developing the white papers.
- Early access to the white papers for use in your planning and programming.
- Invitations to attend exclusive follow-up meetings focused on collaboration and matchmaking related to implementing the strategic roadmap identified in the white papers.

To indicate your intention to join the SFPE Foundation Grand Challenges Initiative as a Founding Partner, please complete the attached form and email it to SFPE Foundation Director Leslie Marshall at foundation@sfpe.org. Once received, SFPE Foundation staff will reply with next steps, including an invoice and instructions to remit payment, if applicable.

SAVE THE DATE

April 26-28, 2022



Virtual Grand Challenges Summit:

Developing a Strategic Roadmap for the Future of Fire Engineering

Grand challenges call for grand solutions. Join us in creating them.



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GRAND CHALLENGES INITIATIVE FOUNDING PARTNER COMMITMENT FORM

In signing this form, I commit (on behalf of myself, company, or organization) to joining the SFPE Foundation's Grand Challenges Initiative as a Founding Partner.

I understand that all GCI Founding Partners are expected to engage by:

- Participating in the 2022 Grand Challenges Summit
- Participating in at least one of the GCI Working Groups
- Publicizing their participation in the GCI (media materials provided by the SFPE Foundation)
- Providing their logo or other organizational information to be listed as a GCI Founding Partner in communications regarding the initiative
- Helping identify other potential partners or collaborators to involve in the GCI

I also understand that all GCI Founding Partners will benefit from engagement through:

- Public acknowledgement of their status as a Grand Challenges Initiative Founding Partner on the SFPE Foundation website, in the marketing materials for the Grand Challenges Summit, and in other published materials related to the Initiative, such as white papers.
- Priority in terms of opportunities to present or moderate at the 2022 Grand Challenges Summit.
- Priority in terms of opportunities to serve on the Working Groups developing the white papers.
- Early access to the white papers for use in your planning and programming.
- Invitations to attend exclusive follow-up meetings focused on collaboration and matchmaking related to implementing the strategic roadmap identified in the white papers.

As a GCI Founding Partner, I commit to making a one-time donation to the SFPE Foundation at the following level (please select one option from the list below):

Industry, Corporations, Foundations, or Individuals:

- ☐ Luminary – \$15,000+ _____ (write-in)
- ☐ Platinum – \$10,000
- ☐ Gold – \$5,000
- ☐ Silver – \$2,500

Non-Profit or Not-for-Profit:

- ☐ Luminary – \$10,000+ _____ (write-in)
- ☐ Platinum – \$5,000 (rec'd if annual operating budget >\$3 mil)
- ☐ Gold – \$2,500 (rec'd if annual operating budget \$1-3 million)
- ☐ Silver – \$1,000 (rec'd if annual operating budget <\$1 million)

Other:

- ☐ Individual academic (no donation required)
- ☐ Academic department or university (no donation required)
- ☐ Government agency or governmental organization (contact SFPE Foundation Director Leslie Marshall)

Name of GCI Founding Partner: _____

Name of Primary Contact: _____

Title of Primary Contact: _____

Email for Primary Contact: _____

Signature: _____ **Date:** _____

Disclaimer: No benefit was bestowed upon this donor in exchange for this contribution. The SFPE Educational & Scientific Foundation is an exempt organization in the United States as described in Section 501(c)(3) of the Internal Revenue Code; EIN 04-2701210. Consult your tax advisor to determine if your contribution is tax deductible.