



13th International Symposium on Fire Safety Science

# **Measurement and Computation of Fire Phenomena** The MaCFP Condensed Phase Working Group

### Introduction

#### **Organizing Committee:**

**Benjamin Batiot** Morgan Bruns Simo Hostikka **Isaac Leventon** Yuji Nakamura Pedro Reszka Thomas Rogaume

(University of Poitiers, France) (Virginia Military Institute, USA) (Aalto University, Finland) (National Institute of Standards and Technology, USA) (Toyohashi University of Technology, Japan) (Universidad Adolfo Ibáñez, Chile) (University of Poitiers, France) Stanislav Stoliarov (University of Maryland, USA)



## Welcome



- "We think ... that the study of fire growth [perhaps the most difficult problem area in fire safety science] ... is now reaching the point where a sound scientific basis is appearing and engineering applications are becoming possible...
- What is required is international cooperation in resolving the remaining scientific problems so that we harmonize our fire safety objectives, design scenarios, hazard assessment, methodologies, models and their verification for eventual incorporation into a common set for fire safety engineering tools. More specifically, we suggest the formation of a series of technical workshops having limited attendance to provide the needed international collaboration."



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#### Letter to the Editor

(Received and accepted 30 June 1994).

0379-7112(94)00016-6

#### Dear Sir

We, the undersigned, have for many years been participants and observers of the international development of fire safety science and its applications. Some applications of fire research have been rapid, some slow. There is a general recognition that one of the most difficult, perhaps *the* most difficult problem area, is that of fire growth, including reaction to fire. Lack of progress in this core area has been a serious obstacle to the world wide development of a design methodology to replace traditional prescriptive methods.

We think, partly as a result of our participation in the recent Fourth International Symposium of Fire Safety Science, that the study of fire growth, especially in buildings—the stage of development of fire that puts people at risk—is now reaching the point where a sound scientific basis is appearing and engineering applications are becoming possible. Studies of fire initiation, fire growth and spread, smoke generation and transport are now all on the threshold of being mature enough to be exploited. What is required is international cooperation in resolving the remaining scientific problems so that we harmonize our fire safety objectives, design scenarios, hazard assessment, methodologies, models and their verification for eventual incorporation into a common set for fire safety engineering tools. More specifically, we suggest the formation of a series of technical workshops having limited attendance to provide the needed international collaboration.

The above position is that of the authors and not necessarily that of the International Association of Fire Safety Science nor that of the Fire Safety Journal.

#### Howard W. Emmons

Harvard University, USA Toshisuke Hirano University of Tokyo, Japan Philip H. Thomas Borehamwood, UK James G. Quintiere University of Maryland, USA Ove Pettersson University of Lund, Sweden

#### Fan Weicheng

University of Science and Technology of China, PRC Wolfram Becker University of Kaiserslautern, Germany John de Ris Factory Mutual Research Corporation, USA

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Emmons et al. Letter to the Editor Fire Safety Journal 1994

## Key Objectives: The Working Group



- Develop standard data set formats for experimental data on pyrolysis;
- Develop requirements for data set quality and establishing a data review committee;
- Incorporate compliant data into the existing MaCFP data repository;
- Create a database of pyrolysis property sets;
- Develop minimum requirements for numerical pyrolysis models;
- Organize a pyrolysis modeling discussion group.

"The purpose of the Condensed Phase Phenomena subgroup is to facilitate data sharing and model development to improve computational predictions of thermal degradation and pyrolysis in fire scenarios."



## Key Objectives: The 2021 MaCFP Workshop

- To catalogue current approaches used to parameterize pyrolysis models;
- To develop standard data set formats for experimental data on pyrolysis;
- To quantify the interlaboratory variability for comparable experimental datasets;
- To assess the impact of the variability of model parameters on predictions of sample burning rate; and
- To present a rigorous analysis of these results in the Fire Safety Journal.



## How far we've come

### NIST

## • 1996 Cone Calorimeter Round Robin:

### Reporting of results:

"The laboratories were all instructed to deliver their data in FDMS format [8] [9] on floppy disks."

## • 2021 MaCFP Workshop

- Main Website: <a href="https://iafss.org/macfp-condensed-phase-phenomena/">https://iafss.org/macfp-condensed-phase-phenomena/</a>
- Github Data repository: <a href="https://github.com/MaCFP/matl-db">https://github.com/MaCFP/matl-db</a>
- Discussion Forum: <u>https://groups.google.com/g/macfp-condensed-phase-discussions</u>
- Virtual Coordination and Communication
  - Guidelines for Participation, Preliminary Summary of Results
  - Virtual Seminars: Summer 2020, Spring 2021

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workshop (published in the Fire Salety -	curral) can be found at the links below				
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and pyrolysis in fire		on the MaCFP Gittlub Rep	ository. Experimental data may be shared	by submitting pull	
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	The Matcher condensed Phase Subgroup homepage is http://whise.org/macfp-condensed-phase- phenomena/				
	All experimental measurements submitted as part of the MaCPP Condensed Phase Workshop are availab here: https://github.com/MaCPP/mathdb				
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Discussions			1		
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## Participants

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Exper.	Model	Participating Institution	City/State, Country
X	Х	Aalto University	Espoo, Finland
x	X Canada	Dansk Brand og Sikringsteknisk Institut, (DBI)	Copenhagen, Denmark
	AB BC	Lund University	Lund, Sweden
X		FM Global	Massachusetts, USA
X	X	Imperial College of London (GIDAZE <sup>14</sup> )     Uzbekistan Kyrgyztan	England, UK
X		Hong Kong Polytechnic University	Hong Kong
X		Laboratoire Central de la Préfecture de Perlice 9/(LCPP)	Paris, France
x	Х	National Institute of Standards and Technology (NIST)	Maryland, USA
x	Х	Sandia National Laboratories	New Mexico, USA
x		Technical Institute of Fire Protection in Prague (TIFP)	Prague, Czech Republic
X	Х	University of Central Lancashire (UCLAN) Zambia	England, UK
x		University of Dayton Research Institute (UDRI)	Ohio, USA
X Paci Oce	ith ific an	University of Edinburgh	Scotland, UK
x	Х	University of Maryland (UMD)	Maryland, USA
X	Х	University of Lille - Unité Matériaux et Transformations (UMET)	Lille, France
	Х	University of Wuppertal (Bergische Universität Wuppertal)	Wuppertal, Germany
X		University of Queensland (UQ)	Queensland, Australia
	Х	Virginia Military Institute (VMI)	Virginia, USA





- 9:00 AM Introduction and Overview; presented by Isaac Leventon
- 9:05 AM Experimental Results and Data Management; presented by Isaac Leventon
- 9:35 AM <u>Discussion</u>: Experimental Results, Future Materials & Experiments; managed by Isaac Leventon
- 10:05 AM Model Parameters and Small-scale Modeling Predictions; presented by Morgan Bruns
- 11:00 AM <u>Discussion</u>: Small-scale Modeling Results; moderated by Morgan Bruns
- 11:30 AM Flame Spread Experiments and Next Steps; presented by Stanislav Stoliarov
- 11:45 AM <u>Discussion</u>: Flame Spread Experiments and Next Steps; moderated by Stanislav Stoliarov
- 12:00 PM Workshop Ends