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## SUNDAY, MAY 12

## Technical Program

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3:30 PM REGISTRATION BOOTH OPENS

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### LECTURE SESSION I – DISCUSSION LEADER: JAIME GRUNLAN

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4:30 PM OPENING REMARKS

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4:45 PM 1. **Alexander Morgan, University of Dayton Research Institute**  
Flammability Measurement of Roofing Materials: Heat Release and Burn-Through Experiments with the “Cube Test”, ASTM E3367

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5:10 PM 2. **Morgan Bruns, St. Mary’s University and Isaac Leventon, National Institute of Standards and Technology**  
Automated Characterization of Thermal Conductivity of Flammable Materials

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5:35 PM BREAK

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5:50 PM 3. **Richard E. Lyon, Federal Aviation Administration**  
Fire Growth Potential of Combustible Solids Measured in the Cone Calorimeter

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6:15 PM 4. **Fernando Raffan-Montoya, University of Maryland**  
Advances in Milligram-scale Flame Calorimetry

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6:40 PM 5. **Mauro Zammarano, National Institute of Standards and Technology**  
Delaying Fire Growth and Preventing Flashover with Flame-Retardant-Free Upholstered Furniture

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7:05 PM WELCOME RECEPTION | END DAILY SESSION

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## MONDAY, MAY 13

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7:30 AM CONTINENTAL BREAKFAST

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### LECTURE SESSION II – DISCUSSION LEADER: ALEXANDER MORGAN

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8:30 AM 6. **Timothy Reilly and Stephen Scherrer, pinfa North America**  
Status of FR-containing Materials for Fire Safety: North American Regulations, Public Perception & Outlook

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8:55 AM 7. **Grace Wan, Dow Chemical Company**  
Emerging Fire Resistance Materials Need and Challenges with Various Applications from Industrial Viewpoints

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9:20 AM 8. **Mark McKinnon, Fire Safety Research Institute**  
Development and Use of the FSRI Materials and Products Database

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9:45 AM BREAK

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10:05 AM 9. **Serge Bourbigot, University of Lille**  
Fire Behavior of Polymeric Materials in O<sub>2</sub> Rich Environment and Under Hydrogen Flame

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10:30 AM 10. **Bernhard Scharfel, Bundesanstalt für Materialforschung und -prüfung (BAM)**  
More than the Sum of its Parts – Synergistic FR-Combinations

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10:55 AM 11. **Gaëlle Fontaine, Centrale Lille Institute**  
Thermoset Resin to Flame Retard Poly(lactic acid)

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11:20 AM 12. **Jaime C. Grunlan, Texas A&M University**  
Heat Shielding and Flame Retardancy from Polyelectrolyte-Based Nanocomposite Coatings

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11:45 AM LUNCH ON YOUR OWN

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## MONDAY, MAY 13, CONT'D

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### LECTURE SESSION III – DISCUSSION LEADER: SERGE BOURBIGOT AND GAËLLE FONTAINE

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| 2:00 PM | 13. | <b>Stanislav I. Stoliarov, University of Maryland</b><br>Targeting Fire-Growth-Controlling Material Properties as a Strategy for Design of the Next Generation of Flame Retardant Materials   |
| 2:25 PM | 14. | <b>Richard N. Walters, Federal Aviation Administration</b><br>Using Machine Learning to Determine Fire Test Parameters  |
| 2:50 PM | 15. | <b>Abdenour Amokrane, EDF R&amp;D</b><br>Influence of Input Parameters Variation Intervals on the Results of Sensitivity Analysis of a Pyrolysis Model  |
| 3:15 PM | 16. | <b>Anthony Chun Yin Yuen, Hong Kong Polytechnic University and Ivan Miguel De Cachinho Cordeiro, University of New South Wales</b><br>Molecular Characterisation on Flame Retardant Mechanism of Phosphorous-Based Polymer Composites |
| 3:40 PM |     | BREAK   |
| 4:00 PM | 17. | <b>Hatsuo Ishida, Case Western Reserve University</b><br>Synthesis of a Bio-Based, Recyclable, Intrinsically Flame-retardant Benzoxazine Resin Satisfying Twelve Principles of Green Chemistry: Quantitative Evaluation               |
| 4:25 PM | 18. | <b>Maude Jimenez, University of Lille</b><br>Self-Stratifying Flame Retardant Coatings for Plastics - towards Eco-Efficient Smart Coatings  |
| 4:50 PM | 19. | <b>Svetlana Tretsiakova-McNally, Ulster University</b><br>Enhancing Fire Retardance of Styrenic Polymers Through a Ter-Polymerization Route   |
| 5:15 PM | 20. | <b>Paul Joseph, Victoria University</b><br>Chemical Modification of Some Acrylic Polymers with Phosphorus-Containing Groups: Effects on Their Flame Retardance  |
| 5:40 PM |     | POSTER SESSION AND RECEPTION  |
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## TUESDAY, MAY 14

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7:30 AM CONTINENTAL BREAKFAST

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### LECTURE SESSION IV – DISCUSSION LEADER: MAUDE JIMENEZ AND CLAIRE NEGRELL

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| 8:30 AM | 21. | <b>Sabyasachi Gaan, Empa Swiss Federal Laboratories for Materials Science and Technology</b><br>Reprocessible Fire Safe Phosphonated Resins |
| 8:55 AM | 22. | <b>Todd Emrick, University of Massachusetts</b><br>Functional Heterocyclic Polymers as Flame-retardant Materials                            |
| 9:20 AM | 23. | <b>Qingsheng Wang, Texas A&amp;M University</b><br>Development of Flame Retardant Technology for Plastics using Metal-Organic Frameworks    |
| 9:45 AM |     | BREAK   |
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## TUESDAY, MAY 14, CONT'D

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10:05 AM 24. **Gordon L. Nelson, Florida Institute of Technology**  
New Flexible Non-Halogen FR Polyurethane Foam

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10:30 AM 25. **Baljinder Kandola, University of Bolton**  
Sensing Early Detection of Fires in Carbon Fibre Composites: Detection of Volatile Evolution during Degradation of Resin

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10:55 AM 26. **Sabine Fuchs, Hamm-Lippstadt University of Applied Sciences**  
N,P-Silane- and Phosphonate-(Co-)Polymer-Functionalized Silica Nanoparticles as Flame Retardants for Transparent Thermoplastics

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11:20 AM 27. **Fabienne Samyn, University of Lille**  
Development of Solutions to Flame Retard PLA/Flax Fibers Composites made from Comingled Non-Woven

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11:45 AM LUNCH ON YOUR OWN

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### LECTURE SESSION V – DISCUSSION LEADER: SABYASACHI GAAN AND SABINE FUCHS

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2:00 PM 28. **Yuan Hu, University of Science and Technology of China**  
Several Typical Phosphorus-Containing Flame Retardants: Synthesis, Performances and Applications

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2:25 PM 29. **Claire Negrell, University of Montpellier**  
Synthesis of Phosphorus Biobased Flame Retardant Additives for the Development of New Binders for Wood Paint with Low Environmental Impact

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2:50 PM 30. **Vinay Medhekar, Cornerstone Chemical Company**  
Melamine-Based Fire-Resistant Polymers

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3:15 PM 31. **Maria Jauregui Roza, Bundesanstalt für Materialforschung und – prüfung (BAM)**  
Weaving through Fire and Force: Fire Behavior, Fire Stability and Modes of Action between Epoxy Resin and Glass-Fiber Composites

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3:40 PM BREAK

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4:00 PM 32. **Valeria Berner, Fraunhofer Institute for Chemical Technology ICT**  
Thermal and Flame-Retardant Epoxy Vitrimers based on Disulfide Bonds

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4:25 PM 33. **Ramaswamy Nagarajan, University of Massachusetts Lowell**  
Regenerative FR Treatment of Cotton and Mechanistic Understanding of FR Characteristics after Washing

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4:50 PM 34. **Helge-Otto Fabritius, Hamm-Lippstadt University of Applied Sciences**  
Bio-Inspired Flame Retardant Systems for Wood-Plastic Composites based on Bio-Based Polybutylene Succinate and Standard Polyolefins

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5:15 PM 35. **Andrew Maizel, National Institute of Standards and Technology**  
Per- and Polyfluoroalkyl Substances in New Firefighter Turnout Gear Textiles

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5:40 PM END DAILY SESSIONS | DINNER ON YOUR OWN

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## WEDNESDAY, MAY 15

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7:30 AM CONTINENTAL BREAKFAST

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LECTURE SESSION II – DISCUSSION LEADER: MAURO ZAMMARANO AND BALJINDER KANDOLA

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**Erik J. Price, Sherwin-Williams**

8:30 AM 36. Linking Chemistry to Market via Problem Statements: Connection of Industry & Solution Space

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**Wei Wang, University of New South Wales**

8:55 AM 37. MXene Networks for Advanced Fire Retardant Polymer Composites

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9:20 AM BREAK

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**Sheng Zhang, Beijing University of Chemical Technology**

9:35 AM 38. Overview on Research and Market of Flame Retardants and Applications in China

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**Xin Wang, University of Science and Technology of China**

10:00 AM 39. Bio-Based, Anti-Flammable and Recyclable Epoxy Thermosets and Fiber-reinforced Composites

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**Mohi Quadir, North Dakota State University**

10:25 AM 40. Development and Evaluation of Fire-Protective Resins Rich in Biobased Contents for Metal Substrate Coatings

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10:50 AM CLOSING REMARKS: ALEXANDER MORGAN

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MONDAY, MAY 13, 2023

POSTER PROGRAM

1. **M. Andruschko**, P. Frank, and U. Jonas, S. Fuchs  
Hochschule Hamm-Lippstadt  
*Synthesis, characterization, processing and flame-retardant properties of halogen-free styrenic copolymers*
2. **Yusuf Ziya Menceloglu**, Gizem Semra Ariturk, and Tugba Ucar Demir  
Sabanci University  
*Synergistic Advancements of Halloysite Nanotube and Commercial Flame Retardant in Low-Density Polyethylene Composite for Enhanced Fire Resistance in Commercial Applications*
3. **Mohammad Bagheri**, Kashani, Sourabh Kulkarni, Md AlAmin, Sourabh Karande, Walter Zukas, Ravi Mosurkal, James Whitten, Ramaswamy Nagarajan, and Amir Ameli  
University of Massachusetts Lowell  
*Fire Retardant Thermoplastic Urethane Membranes Electrospun on Nyco for Chem-Bio Protection*
4. **I.B.Y Chen**, Q Chen, and A.C.Y. Yuen  
City University of Hong Kong, Kowloon Tong  
*Experimental and Molecular Dynamics Investigation on Thermal Oxidation of Graphdiyne Type Materials*
5. **Ivan Miguel De Cachinho Cordeiro**, Richard Kwok Kit Yuen, and Guan Heng Yeoh  
University of New South Wales, Sydney, NSW 2052, Australia  
*Multiscale Pyrolysis Modelling of Polymers Foams*
6. **Changxin Dong**  
Stanford University  
*Water-enhancing fire gel with aerogel activated in situ*
7. **Ander Labaien Etxeberria**, Jochen A.H. Dreyer, and Søren Kill  
DTU Chemical  
*Quantification of pore size and shape distributions in intumescent coatings chars: Effects of heating rate*
8. **Bin Fei**  
Hong Kong Polytechnic University  
*Multifunctional Fireproof Aerogels for Energy Saving*
9. **Sarah G. Fisher**, Danixa Rodriguez-Melendez, Ethan T. Iverson, Thomas J. Kolibaba, and Jaime C. Grunlan  
Texas A&M University  
*Fire Protection of Wood with an Environmentally Benign UV-Cured Polyelectrolyte Complex*
10. **Sarzina Hossain**, Farhan Ansari, and Kimy Yeung  
Dow Chemical  
*Novel Testing Capability for Flame Spread Rate Assessment*
11. **C.-C. Höhne**, C. Vogt, J. Limburger, A. König, and T. Wagener, E. Kroke  
Fraunhofer Institute for Chemical Technology ICT  
*s-Triazine phosphonates as replacement of the flame retardant tris(2-chloro-1-methylethyl)phosphate (TCPP) in polyurethane rigid foams*
12. **Amy C. Kurr** and David P. Harper  
University of Tennessee – Knoxville  
*Multivariate Approach to Predict Thermal Degradation in Wire and Cable Insulation*

**POSTER PROGRAM**

13. **Isaac T. Leventon**, Morgan C. Bruns, and Michael V. Heck  
National Institute of Standards and Technology  
*The NIST Material Flammability Database*
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14. **Maya D. Montemayor**, Natalie A. Vest, Bethany Palen, Dallin L. Smith, and Jaime C. Grunlan  
Texas A&M University  
*Boron-Containing Polyelectrolyte Complex for Self-Extinguishing Polyurethane Foam*
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15. **Beril Oguz**, Emil Lidman Olsson, Jochen A.H. Dreyer, and Kim Dam-Johansen  
Technical University of Denmark  
*Developing a Lab-Scale Testing Method for Intumescent Coatings*
- 
16. **Milton H. Repollet Pedrosa**, Craig Gorin, Ryan Thomas, Hongyun Xu, James (Andy) Kenney, and Bizhong (Rocky) Zhu  
Dow Chemical Company  
*Advanced Silicone Materials solutions for Effective Fire Protection and Safer EV Batteries*
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17. **Thomas W. Roche**, Fernando Raffan-Montoya, Stanislav I. Stoliarov, Alexander B. Morgan, Sourabh Kulkarni, and Ramaswamy Nagarajan  
University of Maryland  
*Use of Milligram-Scale Flame Calorimetry for Characterization Flammability of Fabrick Samples with Flame Retardant Treatments*
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18. **Danixa Rodriguez-Melendez**, Dallin L. Smith, Sarah G. Fisher, Rodolphe Sonnier, Henri Vahabi, and Jaime C. Grunlan  
Texas A&M University  
*Two-Step Polyelectrolyte Complex Coating for Flame Retardant Flax*
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19. **Ruqing Shen**, Yufeng Quan, and Qingsheng Wang  
Marshall University  
*Metal-based Flame Retardants to Improve the Fire Safety of Polypropylene*
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20. Dallin L. Smith, Sidney M. Cotton, Natalie A. Vest, **Maya D. Montemayor**, and Jaime C. Grunlan  
Texas A&M University  
*Phosphate and Nitrogen-Rich Polyelectrolyte Complex Flame Retardant Treatment for Cotton Fleece*
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21. **Rajgopal Subramanian**, Emma E. Murphy, Hector J. Lazaro, Joshua M. Ordonez, Michelle M. Shields, and David J. Irvin  
Quantum Copper  
*Scale-up and Commercialization of a High Molecular Weight Flame Retardant Additive*
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22. **Andre Thompson**, Andrew Maizel, and Rick Davis  
National Institute of Standards and Technology  
*Per- and Polyfluoroalkyl Substances in Firefighter Turnout Gear Textiles Exposed to Abrasion, Elevated Temperature, Laundering, or Weathering*
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23. Anne-Cécile Kervella and **Claudio Toncelli**  
Kermel  
*The Kermel Px: A Modular Concept in the Development of Intrinsically Fire-Resistant Fibers*
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24. **Juan Carlos Gauna** and Morgan Bruns  
St. Mary's University  
*Material-Specific Verification of Fire Model Properties*
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25. **Yanfei Xu**  
University of Massachusetts Amherst  
*Molecular Engineering for Enhanced Flame Retardancy and Reduced Thermal Conductivity in Polymers*