

# COMBUSTION WEBINAR

**High-fidelity simulation of multi-physics processes in aeronautical combustors**

**Speaker:** Dr. Daniel Mira , Barcelona Supercomputing Center

**Time:** May 14<sup>th</sup> 2022

*10:00 NYC; 16:00 Paris; 22:00 Beijing.*

**Zoom Meeting ID: 959 5515 8623**

**Passcode: combustion**

**Check <https://sun.ae.gatech.edu/combustion-webinar>**



**COMBUSTION  
WEBINAR**



**Abstract:** The stringent emission regulations and the EU commitment to achieve net-zero greenhouse gas emissions by 2050 is driving the transportation sector to prioritize the development of low-carbon technologies. A digital transformation can facilitate this transition by providing advanced simulation software that can be used to accelerate the deployment of new concepts to the market. Today, the industrial sector requires more efficient burners, which implies not only a reduction in fuel consumption, but also in pollutant emissions, like NO<sub>x</sub> and soot. This presentation describes recent developments in methodologies and applications for combustion simulations of spray and gaseous flames in gas turbines with focus on soot formation and hydrogen combustion in the context of large-eddy simulations (LES) and High-Performance Computing (HPC).

**Biography:** Daniel Mira is the Head of the Propulsion Technologies Group at the Computing Applications for Science and Engineering (CASE) Department of the Barcelona Supercomputing Center (BSC). Dr Mira received his Bachelors Degree in mechanical engineering from the Universitat Politècnica de Valencia (Spain) in 2008 and his PhD in mechanical engineering from Lancaster University in 2012. His research is focused on the development of advanced simulation methods to investigate the combustion characteristics of propulsion and power systems. The main activities include physical modelling and numerical methods using High-Performance Computing (HPC) and data-driven approaches.

# Combustion Webinar Organizing Committees

## Advisory Committee

**Yiguang Ju** (Princeton University)  
**Fei Qi** (Shanghai Jiao Tong University)  
**Philippe Dagaut** (CNRS-INSIS)  
**Gautam Kalghatgi** (Univ. of Oxford/Saudi Aramco)  
**Med Colket** (RTRC, Retired)

**Chung K. (Ed) Law** (Princeton University)  
**Katharina Kohse-Höinghaus** (University of Bielefeld)  
**Kaoru Maruta** (Tohoku University)  
**Kelly Senecal** (Convergent Science)  
**Toshiro Fujimori** (IHI Inc.)

## Technical Committee

**Wenting Sun** (Georgia Tech) **Co-Chair**  
**Lorenz R Boeck** (FM global)  
**Liming Cai** (Tongji University)  
**Zheng Chen** (Peking University)  
**Matthew Cleary** (The University of Sydney)  
**Stephen Dooley** (Trinity College Dublin)  
**Tiegang Fang** (North Carolina State University)  
**Aamir Farooq** (KAUST)  
**Michael Gollner** (UC Berkeley)  
**Wang Han** (The University of Edinburgh)  
**Jean-Pierre Hickey** (Univ. Waterloo)  
**Xinyan Huang** (Hong Kong Polytech Univ.)  
**Tai Jin** (Zhejiang University)  
**Tina Kasper** (University Duisburg-Essen)

**Isaac Boxx** (DLR) **Co-Chair**  
**Deanna Lacoste** (KAUST)  
**Davide Laera** (CERFACS)  
**Joseph Lefkowitz** (Technion)  
**Qili Liu** (Purdue University)  
**Yushuai Liu** (IET, CAS)  
**Zhandong Wang** (USTC)  
**Nicolas Noiray** (ETH Zurich)  
**Guillermo Rein** (Imperial College London)  
**Xingjian Wang** (Florida Institute of Technology)  
**Jun Xia** (Brunel University London)  
**Huahua Xiao** (USTC)  
**Dong Yang** (SUSTech)  
**Suo Yang** (University of Minnesota)  
**Peng Zhao** (University of Tennessee, Knoxville)

# Disclaimer

- The presentation materials and comments made by the lecturer and participants are only for research and education purposes.
- All presentation materials are the sole properties of the lecturer and the Combustion Webinar organizer, and cannot be published and disseminated without written approvals from both parties.
- This lecture may be recorded and released to public.
- **Please use Chat or Raise Hand to ask your questions.**
- **Please turnoff microphone. Webinar will be locked after 30 minutes.**
- **Recorded lectures are on *Combustion Webinar YouTube Channel***  
[https://www.youtube.com/channel/UCSsO7e9VIn\\_\\_RejSiAPF0JA](https://www.youtube.com/channel/UCSsO7e9VIn__RejSiAPF0JA)