COMBUSTION WEBINAR

Burning metals for carbon-free power

Speaker: Prof. Jeffrey Bergthorson, McGill University

Time: May 28th 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
for details or directly contact wenting.sun@aerospace.gatech.edu.

COMBUSTION WEBINAR

Biography: Jeffrey Bergthorson is the Panda Faculty Scholar in Sustainable Engineering and Design, and a Professor in the Department of Mechanical Engineering, at McGill University where he leads the Alternative Fuels Laboratory. He received his B.Sc. in Mechanical Engineering from the University of Manitoba (1999), and his M.Sc. (2000) and Ph.D. (2005) in Aeronautics from the Graduate Aeronautical Laboratories of the California Institute of Technology. Prof. Bergthorson is a Fellow of the Combustion Institute and a Fellow of the American Society of Mechanical Engineers. Prof. Bergthorson's research interests are in the broad area of the combustion and emissions properties of alternative and sustainable fuels, including biofuels, hydrogen, and the use of metals as carbon-free recyclable fuels.

Abstract: In order to address climate change, we must transition to a low-carbon economy. Many clean primary energy sources, such as solar panels and wind turbines, are being deployed and promise an abundant supply of clean electricity in the near future. The key question becomes how to store, transport, and trade this clean energy in a manner that is as convenient as fossil fuels. The Alternative Fuels Laboratory (AFL) at McGill University is actively researching the use of recyclable metal fuels as a key enabling technology for a low-carbon society. Metal fuels, reduced using clean primary energy, have the highest energy density of any chemical fuel and are stable solids, simplifying storage, transport, and trade. This presentation will overview the concept of using metals as circular carbon-free fuels and the methods to harness the chemical energy contained in the metal fuels. Metal particles can ignite and burn as sparks, which act as micro-diffusion reactors that release heat at discrete points. The rapid release of energy from ignited and burning particles leads to a new combustion regime, termed discrete flames, whose rate of propagation is independent of the heat-release rate and which are predicted to exhibit interesting propagation and quenching behavior.

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 (Beihang University)
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