COMBUSTION WEBINAR

Combustion Fundamentals for Burning and Making Biofuels

Speaker: Phillip Westmoreland, NCSU

Time: Sept. 25th 2021

10 am EDT; 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: Phil Westmoreland is Professor of Chemical and Biomolecular Engineering at North Carolina State University, working in reaction kinetics using experiment, computation, and theory. Major contributions include identifying/quantifying the pivotal role of chemically activated additions in hydrocarbon combustion, benzene formation, and fluorocarbon oxidation; establishing cellulose decomposition as being homogeneous self-catalysis; and co-creating Synchrotron-VUV-Photoionization MBMS. His degrees are NCSU (BS'73), LSU (MS'75), and MIT (PhD'86), where he worked with Jack Howard and Jack Longwell. Prior to N.C. State, he has worked at Oak Ridge National Laboratory / Union Carbide, UMass Amherst, and the U.S. National Science Foundation; was 2013 President of AIChE; and was a board member of the Combustion Institute (2002-2012). His recognitions include the ASEE Corcoran Award, AIChE's Institute Award for Excellence in Industrial Gases Technology, Combustion Institute Fellow, Lawrence Berkeley National Lab's David Shirley Award, and NSF CAREER and Director's Awards.

Abstract: Use of liquid biofuels is increasing because they have high energy densities and are potentially sustainable fuels. They are mostly oxygenated hydrocarbons, where much of the oxygen is in OH groups. Our experiments and modeling have revealed usefully strong analogies in combustion kinetics relative to hydrocarbons, although reaction networks are complicated by the wider range of intermediates and by natural stereochemical constraints.

These biofuels can be produced from woody biomass by pyrolytic processes. Our earlier coal and polymer combustion research helped lead to discovery of the reaction paths that convert woody biomass thermally. It is not by simply pulling molecules apart into radicals, but rather through homogeneous catalysis by the OH groups within the biomass, making molecular intermediates. Again, experiments and modeling have been powerful complements in making these discoveries. In the webinar, I will examine both the combustion and the pyrolysis of these materials. You can see a recent perspective on the latter topic in *Current Opinions in Chemical Engineering* **23** (2019) 123-9.

COMBUSTION WEBINAR
https://combustion.gatech.edu/combustion-webinar/

Combustion Webinar Organization 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 (U. 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