COMBUSTION WEBINAR

Carbon Capture Technology Development in Saudi Arabia

Speaker: Dr. William Roberts, KAUST

Time: Feb. 6th 2021

10 am EST; 4 pm Paris; 10 pm Beijing.

Meeting: *Zoom*

Registration (required):

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

for details or directly contact wenting.sun@aerospace.gatech.edu

COMBUSTION WEBINAR

Biography Dr. Roberts received his PhD in Aerospace Engineering from the University of Michigan in 1992 under the supervision of Prof. James Driscoll. After a two-year stint at NASA Langley working on SCRAMJET concepts, he joined NC State University, where he rose through the academic ranks to professor in 2005. While at NC State, he served as director of the Applied Energy Research Laboratory until leaving for King Abdullah University of Science and Technology at the end of 2011. He was an early member of the Clean Combustion Research Center and became its Director in 2014, a position he continues to hold. The Center has grown to be one of the largest and most productive combustion groups with a truly global footprint. He is an NSF CAREERS and Army Research Office Young Investigator Award recipient, former chairperson of the Eastern States Section of the Combustion Institute, current member of the American Institute of Aeronautics and Astronautics Pressure Gain Combustion TC, Fellow of the Combustion Institute and Associate Fellow of the AIAA. He has more than 200 archival publications in experimental combustion.

Abstract Carbon Capture, Utilization and Storage (CCUS) will play a pivotal role in achieving the "net-zero" emissions goal of the sustainable energy future. Last year, the Kingdom of Saudi Arabia hosted the G20 summit, highlighting the growing need for a Circular Carbon Economy approach, which calls for an orbital shift from the traditional practice of single use and disposal to the atmosphere of the carbon in the energy sources. Cost effective carbon capture from the point sources requires rapid scaling to meet the climate goal. The current mature technologies of carbon capture however are not the most cost and energy efficient. Also, they have operational challenges while dealing with other pollutants in the exhaust of power or industrial plants. This prompts research and development of alternative technologies that have the potential to overcome these challenges. At KAUST, we are currently developing two carbon capture technologies for the point source capture, viz., Cryogenic and Calcium Looping, in collaboration with external partners. The cryogenic carbon capture separates CO_2 from the flue gases by desublimating it, whereas the calcium looping technology uses a two-step sorbent-based reaction using limestone to chemically separate the CO_2. The Cryogenic process has been developed to a pilot scale of 1 ton/day CO_2 capture rate and is currently undergoing demonstrations at various point sources for design validation and process improvements for scale-up. The Calcium Looping research is fundamentally focused on evaluating Saudi limestone variants for the application. This talk will focus on these two technologies in more detail with their working principle, key results, development status and scaling plans.

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 (UTRC, 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) ***Chair***
Lorenz R Boeck (FM global)
Liming Cai (RWTH Aachen 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 (Imperial College London)
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 (Imperial College London)
Suo Yang (University of Minnesota)
Peng Zhao (Oakland University)

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