



**Saudi Arabian Section of
the Combustion Institute**
10th SASCI Annual Meeting
14-15 October 2020



**COMBUSTION RESEARCH
TOWARDS NET-ZERO EMISSIONS
MOBILITY AND POWER**
Virtual Conference

SASCI 2020, jointly organized by the Transport Technologies R&D
Division of Saudi Aramco and the Clean Combustion Research Center
at King Abdullah University of Science and Technology (KAUST)

WWW.SAS-CI.COM

FOCUS OF THE CONFERENCE

- Climate Change and Circular Carbon Economy
- Mobility and Power Generation with Lower Carbon Footprint – including Low Carbon Fuels
- Combustion Emissions – Formation and Reduction
- Advancements in Fundamental and Applied Combustion

INVITED SPEAKERS



Thomas Körfer
FEV GmbH, Aachen



Dr. Thang Pham
Saudi Aramco



Prof. Kambiz Ebrahimi
Loughborough University



Prof. James Turner
University of Bath



Prof. William L. Roberts
CCRC, KAUST



WELCOME

Welcome to the 10th Saudi Arabian Section of the Combustion Institute (SASCI) Annual Meeting. This year celebrates a decade of remarkable growth in combustion science and technology in the Kingdom that has led to the global recognition. The Section now has over 200 active members, and the annual technical meeting attracts internationally renowned researchers with dissemination of high impact discoveries and breakthroughs.

The world is rapidly changing towards sustainable energy and environment, and the Kingdom has set the goal to achieve the Circular Carbon Economy, for which advanced combustion of conventional and renewable fuels will play a vital role. We anticipate SASCI's continuing leadership in such endeavors in the Middle East and around the globe.

The theme of this year's SASCI meeting is "Combustion Research Towards Net-Zero Emissions Mobility and Power." During this challenging time, our pursuit of excellence never stops, and many new research results will be shared and discussed virtually for two days, with the exciting technical program organized by Saudi Aramco. The meeting will feature five keynote speakers and 40 oral presentations across three technical sessions. We hope you enjoy the event



Prof. Hong G. Im
Chairman

Saudi Arabian Section of the
Combustion Institute

**Professor of Mechanical
Engineering**

Clean Combustion Research
Center
King Abdullah University of
Science and Technology,
Saudi Arabia



PROGRAM

Wednesday, October 14th

08.15 – 08.30	Login Phase Webex Link for Attendees Webex Link for Speakers
08.30 – 08.45	Welcome Prof. Hong G. Im, SASCI Chairman, KAUST
08.45 – 09.00	Opening Remarks Dr. Amer A Amer, Saudi Aramco
09.00 – 09.30	Invited Speaker: Thomas Körfer, FEV GmbH Tailored Measures for Net-Zero GHG Emissions with PtX Fuels
09.30 – 10.00	Invited Speaker: Dr. Thang Pham, Saudi Aramco The Circular Carbon Economy
10.00 – 10.20	Short Break
Session I: Decarbonization in Transport and Power sectors Chairs: Dr. Deanna Lacoste, KAUST and Dr. Emre Cenkler, Saudi Aramco	
10.20 – 10.40	Abdul Gani Abdul Jameel, KFUPM Predicting Ignition Quality of Oxygenated Fuels Using Nuclear Magnetic Resonance Spectroscopy and Artificial Neural Networks
10.40 – 11.00	Gani Issayev, KAUST Combustion Behavior of Ammonia Blended with Diethyl Ether
11.00 – 11.20	Frank T. Hong, KAUST Preliminary Investigations of ICE Lubrication System Using Nano-Lubricants
11.20 – 11.40	Hadi Alyami, TVTC Cryogenic Battery: Cheapest Route to 24/7 Wind and Solar
11.40 – 12.00	Omar Al Harbi, KAPSARC How Cost-Effective are EV Subsidies in Reducing Tailpipe-CO2 Emissions? An Analysis of Major Electric Vehicle Markets
12.00 – 13.00	Lunch Break
13.00 – 13.30	Invited Speaker: Prof. James Turner, University of Bath Decarbonization of Transport: Synergies between Hydrogen and Alternative Engine Concepts
13.30 – 13.50	Tamour Javed, Saudi Aramco Low Climate Impact Fuels Solutions for Sustainable Transport: Policy Direction, Options and Comparisons
13.50 – 14.10	Edwing Javier Grajales Gonzalez, KAUST Molecular Dynamic Simulation of Syngas Combustion in Supercritical CO2
14.10 – 14.30	Majed A. Alrefae, Yanbu Industrial College Large-scale Carbon Nanostructure Synthesis by Plasma CVD
14.30 – 14.50	Myriam Belmekki, KAUST Reaction Kinetics of C1-C4 Linear Dialkylethers with Hydroxyl Radicals
14.50 – 15.05	Short Break
15.05 – 15.25	Alberto Ceschin, KAUST Eulerian Modeling and Simulation of Cryogenic Liquid Spray Dynamics for Carbon Capture Applications
15.25 – 15.45	Sultan Hussein Alturkistani, KAUST Importance of Process Variables in Oxidative Coupling of Methane (OCM)
15.45 – 16.05	Yang Li, KAUST Probing Hydrogen-Nitrogen Chemistry: A Theoretical Study of Important Reactions in NxHy, HCN and HNCO Oxidation
16.05 – 16.25	Giuseppe Pezzella, KAUST CO2 Zero-Emission on Vehicles: Capture and Storage System using MOFs
16.25 – 16.30	Wrap-up, A peek into next day's agenda

Time Zone: Saudi Arabia Time (Riyadh, UTC+03:00)



PROGRAM

Thursday, October 15th

08.15 – 08.30	Login Phase For Keynotes and Session 2 : Webex Link for Attendees Webex Link for Speakers For Session 3 (after Keynotes): Webex Link for Attendees Webex Link for Speakers	
08.30 – 09.00	Invited Speaker: Prof. William L. Roberts, KAUST Carbon Capture for a Sustainable Energy Future	
09.00 – 09.30	Invited Speaker: Prof. Kambiz Ebrahimi, Loughborough University Digital Twin of the Vehicle Powertrain based on Virtual Prototyping	
	Session 2: Combustion Emissions – Formation and Reduction Chairs: Dr. Christos Kalamaras, Saudi Aramco and Dr. Tamour Javed, Saudi Aramco	Session 3: Advancements in Fundamental and Applied Combustion Chairs: Dr. Jihad Badra, Saudi Aramco and Dr. Aamir Farooq, KAUST
09.30 – 09.50	Maryam Altaher, Saudi Aramco Selective Aerobic Oxidation of Gasoline using N-Hydroxyphthalimide Catalyst for Cetane Enhancement	Jaeheon Sim, Saudi Aramco CFD-Guided Injector Hardware Optimization for Light-Duty Gasoline Compression Ignition Engine
09.50 – 10.10	Ahmed A. H. Abdelhafez, KFUPM Hydrogen-Enriched Oxy-Fuel Micromixer Combustor for Application in the Allam Cycle of Future Zero-Emission Power Plants	Touqeer Anwar Kashif, KAUST Obulesu Chatakonda, Air Products Challenges in High Pressure Study of Oxygen-Rich Combustion of Methane
10.10 – 10.30	Short Break	
10.30 – 10.50	Vallinayagam Raman, Saudi Aramco Fast Idle Catalyst Light-off Strategy for Gasoline Compression Ignition Engine	Azat Amiralin, KAUST Development of an Acoustic Technique for Measurements of Heat Release Rate Fluctuations in Dual Fuel Burner
10.50 – 11.10	Kai Xu, KAUST Combustion of water/heavy fuel oil emulsified fuel on a swirling flame burner: The changes in emission of soot and cenospheres	Balaji Mohan, Saudi Aramco Machine Learning and Response-surface based Optimization of the Combustion System for a Heavy-duty Gasoline Compression Ignition Engine using CFD
11.10 – 11.30	Abdulrahman Khateeb, KAUST Flame Stability and NO Emissions from Ammonia-Hydrogen Combustion at Elevated Pressures	Minh Bau Luong, KAUST Direct numerical simulations of engine knock in a thermally inhomogeneous ethanol/air mixture
11.30 – 11.50	Muhammad Bilal, Loughborough University Optimization of an Internal Combustion Engine Emissions using Artificial Intelligence	Mohammad Khaled Shakfa, KAUST High-Temperature Laser Diagnostic for Benzene near 14.84 μm
11.50 – 12.30	Lunch Break	
12.30 – 12.50	Nursulu Kuzhagaliyeva, KAUST High Throughput Environmental Assessment of Fuel Combustion	Muralikrishna Khandavilli, KAUST Simulating Combustion Properties of Real Gasolines Using just One or Two Component-surrogates
12.50 – 13.10	Kiran Yalamanchi, KAUST Estimation of JSR Speciation data for hydrocarbons using Data Science	Xiaoyuan Zhang, KAUST A Functional-Group-Based Approach to Modeling Real-fuel Combustion Chemistry
13.10 – 13.30	Mickael Silva, KAUST A Computational Study of a Narrow-throat Prechamber Combustion in a Heavy-duty Engine	Bogdan Ilies, KAUST Low Temperature Combustion and Pyrolysis of Nicotine: Kinetic and Product Analysis by TGA-FTIR
13.30 – 13.50	Yang Li, KAUST Obulesu Chatakonda, Air Products An Extensive Theoretical Study of the Thermochemical Properties of Polycyclic Aromatic Hydrocarbons (PAHs)	Edwin Guevara Romero, KAUST Chemical Characterization of Vacuum Residual Oil

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PROGRAM

Thursday, October 15th

13.50 - 14.10	Short Break	
14.10 - 14.30	Shamjad P. Moosakutty, KAUST Ammonia-Hydrogen Mixture Combustion – Experimental Study Using Jet-stirred Reactor for an Improved Kinetic Mechanism	Mohammad Adil, KAUST Multi-Species Time-resolved Measurements for Chemical Kinetics Studies Using Mid Infrared Absorption Spectroscopy Near 1000 cm ⁻¹
14.30 - 14.50	Amit Katoch, KAUST Effects of Non-thermal Plasma on the Emissions of Swirl Flames	Maria Luis Castela, KAUST Thermoacoustic Effects on Flame Propagation/Quenching Phenomena in Mesoscale Diameter Tubes
14.50 - 15.10	Fakhar Mehmood, Loughborough University Pollution is in the Air: Challenges on the Road	Ribhu Gautam, KAUST Obulesu Chatakonda, Air Products Pyrolysis and Combustion of Heavy Fuel and Vacuum Residue Oil: Kinetic and Product Analysis using a TGA-FTIR
15.10 - 15.25	Closing Remarks – SASCI Chairman, Prof. Hong Im	

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VIRTUAL PLATFORM

This year the event will be held online as a virtual conference. Please use the dedicated **Webex links** for each session given in the **program pages** to login. You can switch between parallel sessions if needed. If you are presenting in one of the sessions please choose **Speakers link** and login using the email address provided with your submission, otherwise if you are joining as an attendee please choose **Attendees** link.

CONTACT INFORMATION

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