COMBUSTION WEBINAR

Gas Turbine Combustion, Current and Future Trends

Speaker: Krishna Venkatesan – GE Research

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Biography: Dr. Venkatesan received his Ph.D from Purdue University in 2007 and currently is a senior combustion engineer in the Thermosciences organization at GE Research where he leads the development and application of optical and laser-based combustion diagnostics for state-of-art gas turbine combustion systems. Dr. Venkatesan's ongoing activities involve next generation combustor and propulsion system design, collaborations with universities and national laboratories in the application of laser-based diagnostics methods to state-of-art combustion systems at engine relevant conditions, acquisition of high-fidelity flow and combustion data for model validations and physics study. Dr. Venkatesan also serves as the Air Breathing mission lead for high-speed propulsion technology activities at GE Research. Dr. Venkatesan is the recipient of 2019 AIAA Propellants and Combustion Best paper Award and is the author of more than 30 peer reviewed articles and 5 patents.

Abstract: Gas turbine combustion systems are optimized to operate over a wide range of fuels, pressures and temperatures. This talk will introduce the audience to gas turbine engine combustors in power generation and aviation applications and discuss aero-engine combustor development process and key design challenges. Experimental diagnostics methods providing quantitative combustor characterization data at engine relevant conditions are sparse. For liquid fuel combustion systems, fuel film thickness, droplet size distribution, fuel-wall impingement dynamics, fuel evolution on the surface of walls, droplet coalescence, fuel film interaction with atomizing air and subsequent shedding dynamics are largely unknown at representative cycle conditions. Both lean and rich-burn combustion systems are prone to thermoacoustic instabilities and robust designs necessitate detailed study of flow-flame dynamics. Subsequently, fundamental research areas related to liquid spray and combustion dynamics studies will be highlighted along with data needs and gaps. The talk will conclude with discussions on future trends including advanced architectures.

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