COMBUSTION WEBINAR

Flame stabilization and combustion modes in scramjets

Speaker: Dan Michaels, Technion, Israel Institute of Technology

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Biography: Dan Michaels is an Assistant Prof. in the Faculty of Aerospace Engineering at Technion – Israel Institute of Technology. His research focuses on combustion and propulsion, with fundamental and applied research related to gas turbines, ramjets, scramjets and rockets. He received his B.Sc. in 2006 and Ph.D. in 2014, both at the Faculty of Aerospace engineering at Technion, Israel. In 2015-2016 he was a postdoctoral fellow at the RGD lab in MIT, before joining the Faculty of Aerospace Engineering at Technion.

Abstract: Major challenges in energy and propulsion technologies are related to flame stabilization and combustion dynamics. In the aerospace industry, there are large investments in new scramjet engine technologies for hypersonic transportation, space access, and defense. Considerable research on scramjets is focused on flame stabilization mechanisms and methods.
The talk will be dedicated to studies on flame stabilization in supersonic flows, typical to scramjet engines. The ability to modify the flame stabilization mode and combustor operation mode by properly staging the fuel distribution will be demonstrated and discussed in light of new experimental results. Hybrid RANS/LES simulations show that transition in flame stabilization mode is related to change in the local combustion modes (premixed or non-premixed). Additional insight is also given by identifying a proper scaling parameter for the effect of fuel composition on the lean blowoff limit.

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