Instabilities in Reactive and Non-Reactive Flowfields: Fundamental Issues Underlying Future Energy and Propulsion Systems

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Lower Level Auditorium, Geddes Hall

Refreshments served at 2:45p.m. in the AME Conference Room, 365C Fitzpatrick Hall

There is a remarkable range of physical phenomena that are foundational to the successful development of efficient, robust energy and propulsion systems. Understanding and potentially controlling such fundamental phenomena can have a profound benefit for these types of engineering systems. This talk will describe research at UCLA on flow and combustion instabilities and their control, in the spirit of this fundamental approach. Focus will be placed on acoustically-coupled combustion processes associated with condensed-phase fuels, as well as the gaseous jet in crossflow, including its shear layer stability characteristics and their control. Interrogation of these rather disparate yet canonical engineering flowfields involves use of experimental diagnostics that reveal heretofore unexplained phenomena. In the problem of an acoustically-driven, burning liquid fuel droplet, phase-locked OH* chemiluminescence imaging reveals a mean (bulk) level of coupling as well as a dynamical coupling between acoustics and reactive processes that have implications for combustion instabilities in a range of propulsion devices. For the jet in crossflow, exploration of shear layer instabilities via acetone PLIF, stereo PIV, and hot wire anemometry enable the determination of flow conditions causing a transition from convective to absolute instability, with attendant alterations in jet structure and the implications for energy-efficient devices.

If you are interested in meeting individually with Dr. Karagozian, please contact Linda at 631-5431.

Midwest Mechanics Seminar Series