

# IQSE AMO QO Seminar Series

Tuesday, April 18<sup>th</sup>, 11:30 am ZOOM & IQSE  
seminar room (MPHY 578)

Pizza will be served for IQSE members at 11:00 am. The talk will start around 11:30 am

## Dr. Waruna Kulatilaka

(Dept. Mechanical Engineering, Texas A&M University)

### Simultaneous Multi-Species Imaging Diagnostics in Gas-Phase Reacting Flows Using Femtosecond Laser Pulses

**EVENT DETAILS:** Advances in ultrashort pulse laser diagnostics enable non-intrusive, high-speed, multi-dimensional imaging of chemical species in reacting flow applications ranging from fundamental flame studies to practical gas turbine combustors, hypersonic propulsion systems, and high-rate material testing. Following the original demonstration of femtosecond two-photon laser-induced fluorescence (fs-TPLIF) of H atoms a decade ago, our group and associated teams have made significant advances in this area. In particular, ultrashort, fs-duration laser methods have enabled interference-free, kHz-rate imaging schemes for highly reactive atomic species such as H, O, and N, and molecules such as OH, NO, CO, and O<sub>2</sub> and flow tracers such as Kr and Xe in combustion and plasma environments. This seminar will first outline several major milestones in ultrashort pulse laser imaging in the last decade, followed by a discussion of recent developments in multi-species imaging using a single femtosecond laser source. The broadband femtosecond pulses have enabled the simultaneous excitation of several key species (for example, CO/OH, H/OH, H/Kr, NO/O/O<sub>2</sub>, NO/O/O<sub>2</sub>/CH/OH) and subsequent 1D or 2D fluorescence imaging at kHz-rates, which is a major step forward in generating model validation data sets for complex turbulent reacting flows ranging from fundamental laboratory flames and low-temperature plasmas to jet engines and hypersonic propulsion test facilities.

#### **ZOOM information:**

<https://tamu.zoom.us/j/98156251523?pwd=QVdSdGxtL1UyY0g1L083SU5QR0QrUT09>

Meeting ID: 981 5625 1523

Passcode: 297578

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