

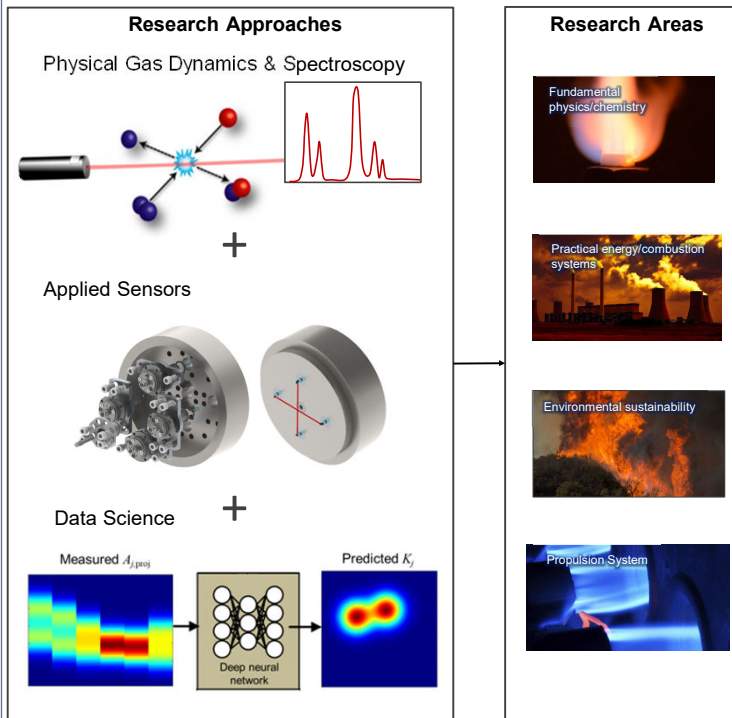


Laser Spectroscopy and High-temperature Reacting Flows

Prof. Chuyu Wei Research Lab
Department of Mechanical Engineering

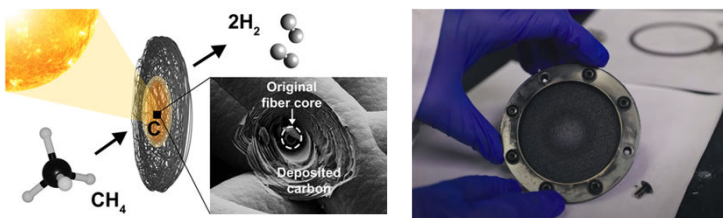
Research Overview

Mission Statement: Advance thermal science, energy, and sustainability through creating novel laser-based sensor technologies



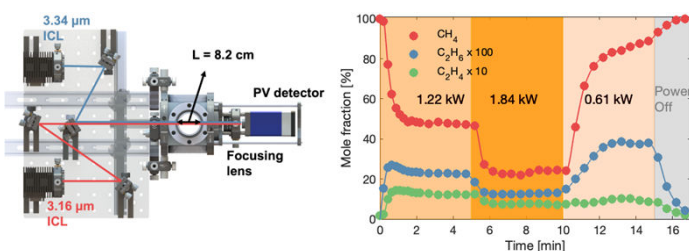
Research Highlight: Hydrogen Energy

Using direct solar power, a novel process was developed to convert methane into hydrogen gas for clean fuels and graphitic carbon, a critical component in lithium-ion batteries used in electrical vehicles and energy storage.



Energy & Fuels 36 (7), 3920-3928

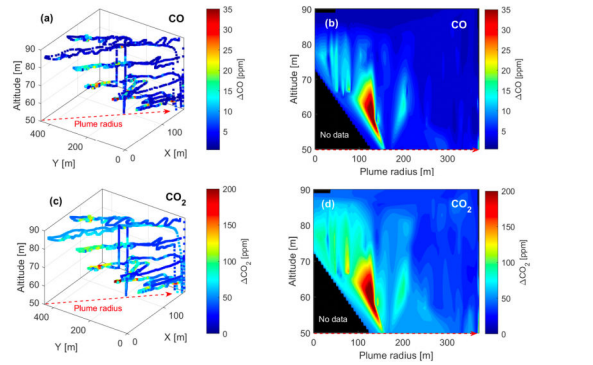
In situ compositional analysis via laser absorption spectroscopy is used to characterize the output of a concentrated solar-thermal methane pyrolysis process over a range of test conditions.



Proceedings of the Combustion Institute 39 (4), 5581-5589

Research Highlight: Fire Safety

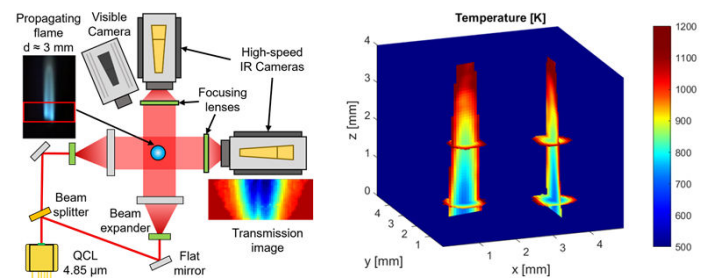
A compact infrared absorption spectrometer is developed and integrated with a light-duty unmanned aerial vehicle (UAV) to provide high-resolution, real-time spatial mapping of species concentrations in harsh, dynamic wildfire environments.



AIAA SCITECH 2022 Forum (p. 2291).

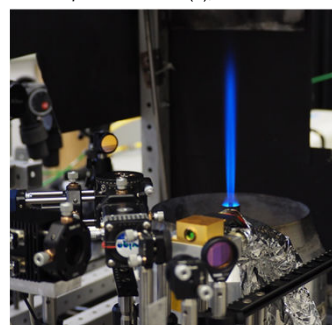
Research Highlight: Multi-dimensional Imaging

Our group has pioneered the novel multi-dimensional, quantitative laser absorption imaging (LAI) technique for species and temperature measurements in high-temperature reacting flows. This innovative approach enables detailed insights into the complex coupling of chemical kinetics and transport processes in flames, advancing the development of accurate computational flame models.



Optics express, 26(16), 20944-20951.

Optics Letters 49 (1), 141-144



Combustion and Flame 221, 371-383

