Mechanical Engineering Department Seminar

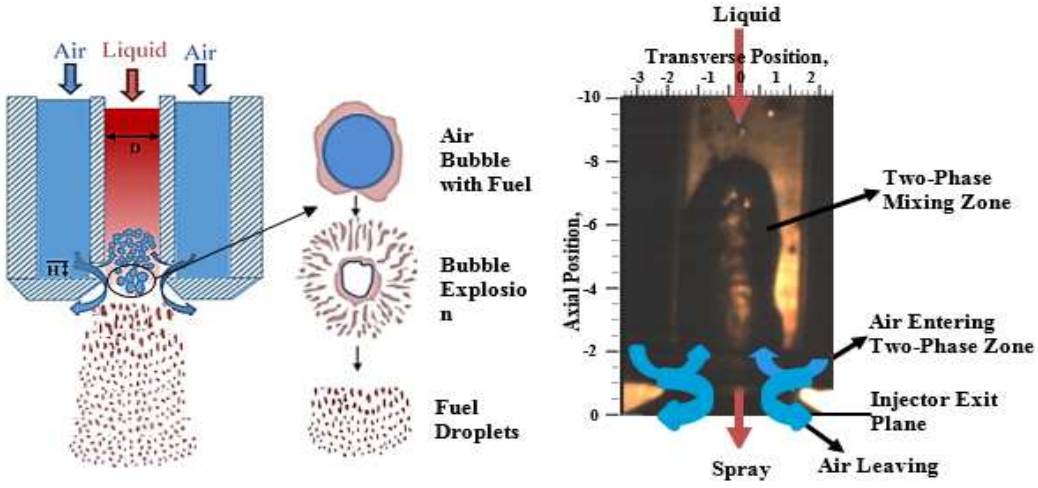
3:35pm February 17, 2016
1130 Mechanical Engineering
111 Church Street SE, Minneapolis, MN 55455

Fuel Atomization for Clean, Fuel-Flexible Combustion of Liquid Fuels

Ajay K. Agrawal

Professor; University of Alabama – Tuscaloosa

In recent years, climate change concerns have increased the scrutiny on emissions of greenhouse gases such as carbon dioxide (CO_2) formed by the combustion of fossil fuels. Biofuels derived from agricultural products (i.e., biomass) offer the potential of a sustainable energy future, but we still need to compliment them with conventional resources to meet our near-term energy needs. Regardless of the energy source (renewable or non-renewable) combustion remains an important topic of research to address enormous challenges faced by the energy usage. This presentation will provide an overview of author's research on novel fuel atomization and combustion concepts offering fuel flexibility and low-emissions. Presentation will highlight that the common view of linking fuels with harmful pollution often ignores combustion innovations possible by tailoring the fluid flow and heat transfer to influence the fuel chemistry. The presentation will highlight a simple fuel injector concept (and associated flow, heat transfer, and combustion features) allowing clean combustion of conventional and alternative fuels to achieve high efficiency, fuel flexibility, and low emissions.



Bio: Professor Ajay K. Agrawal is the Robert F. Barfield Endowed Chair Professor in the Department of Mechanical Engineering at The University of Alabama (UA). After receiving his PhD from the University of Miami in 1988, Prof. Agrawal worked at Michigan Tech University, Clemson University, and University of Oklahoma before joining UA in 2005. His research focuses on low-emission combustion systems for power generation and propulsion, biofuels and alternative fuels, control of combustion noise and thermo-acoustic instability, and meso-scale combustion. Professor Agrawal pioneered Quantitative Rainbow Schlieren Deflectometry, an optical diagnostics technique for scalar measurements in reacting and non-reacting flows. His research has been supported by DOE, NASA, Army, Navy, Air Force, NSF, US Department of Education, among others. He holds 2 patents and has authored over 250 referred and conference publications. Professor Agrawal is Chair of US Sections of the Combustion Institute, past chair of the US Central States Section of the Combustion Institute, and Vice-chair of ASME Turbo Expo Coal, Biomass, and Alternative Fuels Committee. He is associate Editor of ASME Journal of Gas Turbines for Engineering and Power, Fellow of ASME, and Associate Fellow of AIAA.