



*American Institute of  
Aeronautics and Astronautics  
Dayton-Cincinnati Section*

**Lunch 'n' Learn**

**Friday 23 Apr 2010**

**“Combustion Measurements with  
Picosecond and Femtosecond Lasers”**

**Guest Speaker:**

***Dr. James Gord, AFRL***

Optical measurement techniques are powerful tools for the detailed study of combustion chemistry and physics. Although traditional combustion diagnostics based on continuous-wave and nanosecond-pulsed lasers continue to dominate fundamental combustion studies and applications in reacting and non-reacting flows, revolutionary advances in the science and engineering of ultrafast (picosecond- and femtosecond-pulsed) lasers are driving the enhancement of existing diagnostic techniques and enabling the development of new measurement approaches. The ultrashort pulses afforded by these new laser systems provide unprecedented temporal resolution for studies of chemical kinetics and dynamics, freedom from collisional-quenching effects, and tremendous peak powers for broad spectral coverage and nonlinear signal generation. The high pulse-repetition rates of ultrafast oscillators and amplifiers allow previously unachievable data-acquisition bandwidths for the study of turbulence and combustion instabilities. Applications of ultrafast lasers for optical measurements in sprays and combustions flows will be discussed, emphasizing recent achievements and future opportunities, especially in femtosecond ballistic-photon imaging of dense sprays and ultrafast coherent anti-Stokes Raman scattering (CARS) thermometry in combustions flows.

Dr. James Gord is the Principal Research Chemist with the AFRL's Propulsion Directorate and leads the development and application of optical measurement techniques for advanced propulsion and fuel systems as Director of the Combustion and Laser Diagnostics Research Complex. His work has produced five patents, two book chapters, more than 100 peer-reviewed journal articles, and more than 580 conference papers and presentations. Jim is a Fellow of the Optical Society of America and an AFRL Fellow. He is also a two-time winner of the Propulsion Directorate's S. D. Heron Award. Jim is an Associate Fellow of AIAA and was the 2008 winner of the Outstanding Technical Achievement Award from AIAA.

**Time:** 11:45 am

**Location:**

*China Garden Buffet  
112 Woodman Dr.  
Dayton, OH 45431*

**Lunch:**

*You will be able to  
purchase the buffet*

