Our Mission

To provide the next generation of combustion researchers with a comprehensive knowledge in the technical areas of combustion theory, chemistry, experiment, computation and applications.

The 2013 Session

The 2013 Princeton-CEFRC Summer School on Combustion, scheduled for **June 23 to June 28, 2013,** will offer the following courses: (1) Combustion Theory; (2) Combustion Chemistry; (3) Quantitative Laser Diagnostics for Combustion Chemistry and Propulsion; and (4) Computational Turbulent Combustion.

Application Materials

Applications should be submitted at www.princeton.edu/cefrc and received by March 15, 2013. Acceptances will be communicated by March 29, 2013.

Program Dates

Arrival & Welcome Dinner: Sun June 23, 2013 at 5:30pm
Class Schedule: Mon June 24, 2013 to Fri June 28, 2013
Closing Dinner: Fri June 28, 2013
Departure/Check Out: Sat June 29, 2013

Course Description (visit www.princeton.edu/cefrc for detailed course descriptions)

Combustion Theory

Lecturer: **Prof. Moshe Matalon,** University of Illinois at Urbana-Champaign

The aim of this course is to provide students with an understanding of the basic principles of combustion processes, how they relate to experimental observations and how they are used in theoretical and numerical modeling. The lectures will cover the fundamentals of chemically reacting flows, classification of combustion waves, the structure of deflagrations and detonations, hydrodynamics effects, ignition and extinction phenomena, flame instabilities, and aspects of multi-phase and turbulent combustion.

Combustion Chemistry

Lecturer: **Prof. Michael J. Pilling,** University of Leeds

The aim of this course is to provide students with an understanding of how rate coefficients and products of elementary reactions of importance in combustion are determined experimentally, how they are used in conjunction with theoretical models and how they are incorporated in chemical mechanisms for use in combustion models. Determination of the thermodynamic properties for radical species will also be discussed. The course will be illustrated by a number of examples of relevance to high and low temperature hydrocarbon oxidation and NOx formation and control; with a discussion on the impact of combustion emissions on climate change and air quality.

Quantitative Laser Diagnostics for Combustion Chemistry and Propulsion

Lecturer: **Prof. Ronald K. Hanson,** Stanford University

Fundamentals of laser absorption and laser-induced fluorescence in gases, including molecular spectroscopy and photophysics. Basics of shock tubes as a primary tool for studying combustion chemistry, including recent advances. Example state-of-the-art applications of species-specific sensing for shock tube kinetics studies, and multi-parameter sensing in different types of propulsion flows and engines.

Computational Turbulent Combustion

Lecturer: **Dr. Thierry Poinsot,** Institut de Mécanique des Fluides de Toulouse, CNRS

This course will enable engineers and research specialists with knowledge of fluid mechanics to move to an integrated understanding of numerical combustion especially in the field of unsteady turbulent combustion. It will present basic techniques and recent progress in numerical combustion while establishing important connections with the underlying combustion basics. The course will include RANS, LES, and DNS modeling but also numerical methods adapted to these models. It will present and explore multiple examples of turbulent combustion and combustion instabilities in real combustors.

CEFRC

2013 PRINCETON-CEFRC
Summer School on Combustion

Further inquiries on the academic program or logistics of participation may be made by contacting Prof. Chung K. Law, director of the CEFRC, cklaw@princeton.edu, 609.258.5271, or Lilian Tsang, program administrator, ltsang@princeton.edu, 609.258.5041. Visit us online at WWW.PRINCETON.EDU/CEFRC.