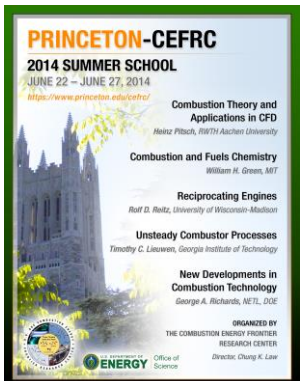

Our Mission

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 2014 Session

The 2014 Princeton-CEFRC Summer School on Combustion, scheduled for **June 22 to June 27, 2014,** will offer the following courses: (1) Combustion Theory and Applications in CFD; (2) Combustion and Fuels Chemistry; (3) Reciprocating Engines; (4) Unsteady Combustor Processes; and (5) New Developments in Combustion Technology.

Application Materials

Submit application at www.princeton.edu/cefrc by March 14, 2014. Acceptance will be communicated by March 28, 2014.

Program Dates

Arrival & Welcome Dinner: Sun. June 22, 2014; dinner at 6:30pm
Class Schedule: Mon. June 22, 2014 to Fri. June 27, 2014
Closing Dinner: Fri. June 27, 2014
Departure/Check Out: Sat. June 28, 2014

Course Description

Combustion Theory and Applications in CFD Course Length: 15 hours (Mon. to Fri.)

Lecturer: **Prof. Heinz Pitsch**, RWTH Aachen University

Fundamental knowledge in laminar and turbulent combustion and applications in CFD: laminar premixed and diffusion flame structure, flammability limits, introduction to turbulence, LES, introduction to turbulent combustion and modeling, regimes of premixed combustion, turbulent burning velocities, flamelet concept and its applications for nonpremixed turbulent combustion, CFD and numerical combustion with application to internal combustion engines and gas turbines.

Combustion and Fuels Chemistry Course Length: 15 hours (Mon. to Fri.)

Lecturer: **Prof. William H. Green**, MIT

Why and how changing the fuel changes combustion performance. Fundamentals of combustion chemistry and related chemical kinetics: experimental rate measurements, thermodynamics, thermochemical properties, basic quantum and statistical mechanics, transition state theory, RRKM theory & master equations, functional group estimation methods, methods for building and effectively using large reaction mechanisms. Important reactions in different combustion regimes or phenomena. Criteria for a new fuel to be successful.

Reciprocating Engines Course Length: 15 hours (Mon. to Fri.)

Lecturer: **Prof. Rolf D. Reitz**, University of Wisconsin at Madison

Engine fundamentals and performance metrics, computer modeling supported by in-depth understanding of fundamental engine processes and detailed experiments in engine design optimization.

Unsteady Combustor Processes Course Length: 9 hours (Wed. to Fri.)

Lecturer: **Prof. Timothy C. Lieuwen**

This course will address the unsteady combustor physics that define many of the most important considerations associated with modern combustor design. These unsteady processes include *transient, time harmonic*, and *stochastic* processes. For example, ignition, flame blowoff and flashback are *transient* combustor issues. Similarly, combustion instabilities are a *time-harmonic* unsteady combustor issue where the unsteady heat release excites natural acoustic modes of the combustion chamber.

New Developments in Combustion Technology Course Length: 6 hours (Mon. and Tue.)

Lecturer: **Dr. George A. Richards**, **NETL, DOE**

This course will introduce students to emerging combustion technologies including chemical looping combustion, pressure-gain combustion, and oxy-combustion for magnetohydrodynamic power generation. For each of these technologies, the basic chemistry and physics will be described, along with a presentation of the problems that must be addressed to develop these interesting new ideas.

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2014 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.