DEPARTMENT OF MECHANICAL ENGINEERING
Purdue School of Engineering and Technology

FALL 2003 SEMINAR SERIES

Date: Thursday, October 2, 2003
Time: 11:00 am - 12:00 pm
Room: SL 165

Reception at 10:45 am (cookies and refreshments served)
Everyone is invited

Development of a Pulse Detonation Engine Facility

Dr. Steve Heister

Professor of Aerospace Engineering
Purdue University, West Lafayette, IN

Abstract. The development of high-speed electronics and valving in recent years has led to an interest in propulsion systems making use of unsteady combustion processes. Within the past 10-15 years, there has been a concerted effort in this country to develop and harness pulsed detonation processes for aerospace applications; the Pulse Detonation Engine (PDE). The PDE relies on a series of tightly controlled fill, detonation, and purge processes to achieve efficient thrust production based on a constant-volume combustion process. Numerous studies have focused on the potential performance advantages of such devices in contrast to the current steady-state, constant pressure combustion devices such as gas turbines or rocket engines. Several government, university and industrial labs are now operating PDEs operating at frequencies as high as 60-80 Hz. In 2001-2002, a cyclic PDE rig based on the use of high-speed automotive valving was designed and construction within the Maurice J. Zucrow Laboratories which lie to the west of Purdue's main campus the West Lafayette. The lecture will focus on developments at this lab as well as some fundamental issues serving as an introduction. A brief summary of other propulsion projects that are underway at the West Lafayette campus will also be provided.

About the Speaker. Dr. Heister has bachelors and masters degrees in Aerospace Engineering from the University of Michigan, Ann Arbor in 1981 and 1983, respectively. He obtained his Ph. D. from UCLA in 1988. Between 1981 and 1990, he garnered valuable work experience in both turbomachinery and rocket propulsion systems at Lockheed California Company in Burbank, CA and The Aerospace Corporation in El Segundo, CA. During his seven year tenure at Aerospace, he served in the Propulsion Department and as a Manager of the Propulsion Technology Section from 1988-1990. Since joining Purdue in 1990, he has conducted research in atomization, injector simulations, hybrid and liquid rocket combustion, pulse detonation engines, and propulsion system design. Professor Heister is a Purdue University Faculty Scholar and has won the School of Aeronautics and Astronautics E. F. Bruhn departmental teaching award three times. Most recently, he was named as the Director of the Rolls-Royce University Technology Center in High Mach Propulsion.