STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

Tuesday July 8, 2008
Carnegie Room 315, Time 2 pm

Petroleum-derived aviation fuels: Future alternatives and development of surrogate mixtures and combustion chemistry models

Marcos Chaos
Department of Mechanical and Aerospace Engineering
Princeton University

The rising global demand of crude oil and the possibility of peak supply and future decline have catalyzed interest in alternatives for satisfying air transportation fuel requirements. Both military and commercial sectors have recently addressed the need for secure, reliable, and economic sources of energy that can be immediately utilized using established infrastructures. Furthermore, climate change concerns due to the greenhouse effect of anthropogenic CO2 require that future fuel alternatives have the ability to reduce carbon emissions. In this talk some proposed alternatives will be reviewed with emphasis on the viability and potential of synthetic fuel generation via coal-biomass-to-liquid (CBTL) with carbon capture and storage (CCS) technologies. In addition, methodologies will be discussed for the selection of fuel surrogate mixtures comprised of a limited number of components. Proper selection of these mixtures can be made so that combustion related gas phase chemical-kinetic, transport, and physical properties of real fuels can be accurately reproduced. Coupled with detailed combustion chemistry models, this will permit the assessment of the effects of fuel property changes on existing hardware performance as well as the development of future propulsion systems.

Marcos Chaos received a B.S. degree in Aerospace Engineering (1998) and a Ph.D. degree in Mechanical Engineering (2003) from the University of Central Florida where he was also a lecturer for several years. He joined Princeton University's Fuels and Combustion Research Laboratory in 2005 and is presently a member of the senior research staff. His research interests are quite broad and include combustion and flame phenomena, alternative fuels, chemical kinetics, fluid dynamics, heat transfer, experimental laser and optical techniques, pollutant emissions of combustion systems, propulsion, and acoustics. Currently he is heavily involved in energy research at Princeton collaborating with the Princeton Environmental Institute as well as other members of industry and academia, studying the behavior of conventional, alternative, and surrogate fuels under practical conditions.

For more information, please contact Prof. Frank Fisher at Frank.Fisher@stevens.edu or 201-216-8913