



# MECHANICAL ENGINEERING SEMINAR

## Performance Enhancement of Gas Turbines Employing Constant-Volume Combustion

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The gas turbine has been recognized as an enormously successful power source for power plants, electric power generation, and aircraft/marine propulsion. Nevertheless, it is not very efficient in converting fuel energy to useful work, due to fundamental thermodynamic limitations imposed by turbomachinery technology. In recent years, there is renewed interest in the potential of alternative high efficiency thermodynamic cycles and unsteady combustion systems for propulsion and stationary gas turbine applications. Among several innovative solutions, integrating pulse detonative combustors and wave rotors into gas turbine systems have received significant attention. Such pressure-gain combustion systems create nearly constant-volume combustion which results in a higher cycle thermal efficiency than conventional constant-pressure combustors. This presentation discusses benefits and challenges of pressure-gain combustions systems for gas turbines, highlighting the ongoing joint research effort between industry and universities to design and test a combustion wave rotor demonstrator rig.



Dr. Pejman Akbari is an Engineering and Research Consultant known for his expertise in utilizing unsteady flows for propulsion and power generation systems. He has served as Senior Research Engineer at FM Global (2008-2009), Assistant Professor of Mechanical Engineering at Manhattan College (2006-2008), and Postdoctoral Research Fellow at Purdue School of Engineering and Technology in Indianapolis (2004-2006). He has a B.S. (1996) and M.S. (1998) degrees in Aerospace Engineering, and a Ph.D. (2004) in Mechanical Engineering from Michigan State University. Dr. Akbari is the author of over 35 peer-reviewed journal/papers and 3 patents related to nonsteady-flow devices.

***Hosted by Professor Vijay Modi***

**Friday, APRIL 3rd, 2009**

**233 Mudd**

**10:00 am**

**Breakfast at 9:30 am in the MECE lobby**