

**DEPARTMENT OF MECHANICAL ENGINEERING  
Purdue School of Engineering and Technology**

**SUMMER 2006 SEMINAR SERIES**

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**Date: Monday, August 7, 2006**

**Time: 11:30 am – 12:00 pm**

**Room: ET 137**

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**DEVELOPMENT AND DEMONSTRATION OF A 3D CFD METHODOLOGY  
FOR LABYRINTH SEAL STUDIES IN THE GAS TURBINE INDUSTRY:  
HONEYCOMB LANDS WITH AND WITHOUT RUB-GROOVES**

***ME 597 Project Presentation***

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**Abstract.** The increasing cost of fuel has put significant financial pressure on the energy, marine, and civil aerospace industries—that is, those powered by gas turbine engines. It is a crisis-of-sorts, and these industries are placing the onus on the gas turbine industry to improve fuel efficiency. And, as in all crises, opportunity lurks: along with the price of oil rises the financial incentive to improve efficiency.

The primary objective of this work was to develop an effective and efficient computational methodology for studying leakage characteristics of labyrinth seals with honeycomb lands. The secondary objective was to apply the methodology to the case of a single-knife labyrinth seal and evaluate the leakage impact of a rub groove in the honeycomb land. Performance against these objectives was to be demonstrated by answering four questions. Positive answers to Questions 1 and 2 would imply the development of a powerful methodology for studying seals with honeycomb lands; answers to Questions 3 and 4 would suggest an advancement of the gas turbine industry's understanding of the leakage impact of rub grooves on honeycomb lands.

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**About the Speaker:** Josh Peters is presenting on the conclusion of this ME597 Project in partial fulfillment of the requirements for the degree of Master of Science in the Department of Mechanical Engineering. He is completing a combined B.S. degree from Physics & M.S. degree from Mechanical Engineering (BPMME) at IUPUI. His advisors are Dr. Hasan Akay at IUPUI and a number of fine engineers in the Aerothermal Design group at Rolls-Royce Corporation. He is expected to begin full-time employment Rolls-Royce in August.