



DEPARTMENT OF MECHANICAL ENGINEERING Purdue School of Engineering and Technology

FALL 2003 SEMINAR SERIES

Date: **Wednesday, November 26, 2003**

Time: **9:00 am - 10:00 am**

Room: **SL 165**

Reception at 8:45 am (cookies and refreshments served)
Everyone is invited

Statistical Design-of-Experiments in the Investigation of the Wave Ejector (Thesis Defense)

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Abstract. The purpose of this research is to investigate and improve the performance of the wave ejector with the help of statistical design-of-experiments (DOE) method. The wave ejector, originally developed from the typical pulse detonation engine (PDE) and then the wave rotor PDE, is a new concept of propulsion engine concept. By combining the wave rotor PDE with a non-steady ejector device, the wave ejector is expected to be capable of enhancing propulsion efficiency and solving several challenges in the development of the current PDE technology.

The wave ejector model is presented and the operation process is illustrated. Numerical simulations, which used a one-dimensional CFD code, are conducted to evaluate the performance of the wave ejector based on specific impulse. A statistical DOE approach is used to investigate the design parameters of the wave ejector and to optimize wave ejector performance. Several key parameters that have significant effect on the wave ejector performance were selected. A DOE approach that reduces the effect of missing data was developed. Optimal settings of the key design parameters were obtained for the purpose of high specific impulse. Follow-up experiments were conducted to verify the DOE prediction.

About the Speaker. Tao Geng obtained his B.S. in Mechanical engineering from North China University of Technology, Beijing in 1999. He is currently a research assistant working in the area of pulse detonation engine.