

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

**FALL 2008 SEMINAR SERIES**

---

**Date: Monday, September 8, 2008**

**Time: 11:00 am – 12:00 pm**

**Room: SL 165**

**Everyone is invited**

---

**Comparison and Inspection of Free-Form Surface**

**Dr. Peihua Gu, Professor, Department of Mechanical and Manufacturing Engineering, The University of Calgary, Calgary, Alberta, Canada**

**Abstract.**

Free-form surfaces are widely used in many fields with extensive applications ranging from automotive industry to biomedical engineering. In the last several decades, significant advancements have been made in modeling, design and manufacturing of objects with free-form surfaces. Once such surfaces are designed and manufactured, surface inspection compares the manufactured surfaces with the design models to verify conformance. To compare two free-form surfaces, the manufactured surface and the design model must be brought to the same coordinate system through localization. This presentation will describe a feature-based method for automatic localization and comparison of free-form surfaces for inspection. This method localizes the measurement surface to the design model through two steps. The first step is general localization based on the correspondence between the features extracted from both surfaces. The second step is fine localization that solves the point to point correspondence and localizes the surfaces accurately. This presentation will also discuss developments of surface inspection techniques for profile tolerance of free-form surfaces. Examples will be presented to illustrate the methods.

**About the Speaker.**

Peihua Gu is a Professor of Mechanical and Manufacturing Engineering, the University of Calgary, Canada. Currently, he is seconded to Shantou University, China as Provost and Vice President (Academic). Prior to the secondment, Dr. Gu was the Head of the Department of Mechanical and Manufacturing Engineering from 1999-2005. He held NSERC Chair in Life Cycle Design Engineering at the University of Calgary from 2000-2006. His current research interests include Adaptable Design, Robust Design and CAD/CAM. Dr. Gu is an elected Fellow of Canadian Academy of Engineering and Fellow of International Academy for Production Engineering (CIRP). He received his B.Eng (Dip) and M.Eng from Tianjin University and PhD from McMaster University.