

Seminar Series

**Manufacturing Systems Modeling and Simulation:
From Fixture Design to Production Planning**

Professor Yiming (Kevin) Rong
Director of Computer-aided Manufacturing Laboratory
Worcester Polytechnic Institute
<http://www.me.wpi.edu/Research/CAMLab>

Date: November 25, 2009 (Wednesday)

Time: 13:30pm

Venue: Room B6605, CSE Conference Room

ABSTRACT

Manufacturing in automotive and aerospace industries involves tooling intensive operations. Fixturing is an important aspect of tooling and contributes to the quality, cost, and the cycle time of production significantly. Computer-aided fixture design (CAFD) technique has been rapidly developed to reduce the lead-time involved in manufacturing planning and process verification.

For many years, four generations of CAFD technique and systems have been developed in Dr. Rong's group. CAFD can be used in 1) rapidly generating a fixture design in both conceptual and detail levels, 2) specifying technical requirements of a fixture design, and 3) verifying the performance of a fixture design. The technical problems are focused on how to represent and utilize the best-practice knowledge, generate design solutions based on geometric reasoning, and provide CAD tools to ease and validate the designs.

The research on CAFD has been expanded to production planning for design, analysis, and simulation of production systems with the concept of concurrent engineering. A CAD integrated production planning system has been developed for mass customization. The technique of correlating feature parameters to process parameters as well as machine tool capability is developed for rapid evaluation of manufacturing system design. Based on the analysis of product design tolerance and manufacturing resource, a production plan can be automatically generated while the best practice knowledge is also applied. The system is validated and applied in Delphi.

Other teaching and research activities and accomplishments will be also introduced.

BIOGRAPHY

Yiming (Kevin) Rong is the Higgins Professor of Mechanical Engineering and the Director of Computer-aided Manufacturing Laboratory at WPI. He holds a B.S. in ME from Harbin University of Science and Technology, China; an M.S. in Manuf. Engr. from Tsinghua University, Beijing, China; an M.S. in IE from University of Wisconsin-Madison; and a Ph.D in ME from University of Kentucky. Dr. Rong worked as a faculty member at Southern Illinois University for eight years before joining WPI in 1998.

Dr. Rong's research area is Computer-aided Manufacturing, including Manufacturing Systems and Processes, and Computer-aided Fixture Design (CAFD). The research on CAFD has been recognized internationally. He is the principal investigator of several research projects funded by the NSF, Department of Energy (DOE), Air Force, SME, and major manufacturing companies, such as Pratt & Whitney, GE Aircraft Engines, Ford, Caterpillar, Delphi, and Ingersoll. Dr. Rong is a fellow of ASME and member of SME, and has published two books on Computer-aided Fixture Design and many technical papers in journals and conference proceedings.

Enquiry: 2788 8420

All are welcome!

MEEM Seminar 2009-2010/014