



Dr. Thomas R. Kurfess
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BMW Chair in Manufacturing
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Ph.D., M. I. T., 1989
S.M.(EECS), M. I. T., 1988
S.M.(ME), M. I. T., 1987
S.B., M. I. T., 1986

Teaching Interests:

Manufacturing, design,
control, mechatronics and
precision system design

Research Interests:

system dynamics, control,
metrology, CAD/CAM/CAE,
and precision system design

Research

Dr. Kurfess' research focuses on the control of precision grinding systems that involve the development and implementation of adaptive controllers for precision grinding operations, including bore grinding, through feed centerless grinding and surface grinding. Ultrarigid machine tools with open architecture controls are employed. The results of this work are used in a number of industrial environments.

His project on precision measurement involves the use of coordinate measurement machines to verify part geometry in three dimensions. Algorithms are developed to interface directly with coordinate measurement machine controlling software. Currently, the metrology systems developed in this project are being used in the verification of parts on actual production lines.

The research in the measurement of rapid prototyped parts involves the use of a laser scanning system to validate complex geometries produced in the rapid prototyping process. Data points generated from the scanner are directly compared with computer-aided design models to confirm that the part produced matches the design model.

The project in real-time bearing diagnostic systems addresses diagnostics of rolling element bearings via advanced signal processing techniques. Currently, the test facilities employ standard accelerometers, proximity sensors, and acoustic emission sensors, as well as a newly developed contact potential difference probe.

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Representative Publications

T. R. Kurfess (Ed.). 2005. *Robotics and Automation Handbook*. CRC Press, Inc., Boca Raton, Florida.

D. Chinn, et al. 2004. Three-Dimensional Imaging of Liga-Made Microcomponents. *ASME Journal of Manufacturing Science and Engineering* **126** (4), 813-821.

B. Kim, et al. 2004. Scanning Grating Microinterferometer for MEMS

Metrology. *ASME Journal of Manufacturing Science and Engineering* **126** (4), 807-812.

J. F. Nichols and T. R. Kurfess. 2004. Metrology of High Aspect Ratio MEMS. *Journal of Microsystem Technologies* **10** (6), 556-559.