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Department of Mechanical Engineering
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**“Optomechatronics Research in the Center for Automation Technologies
and Systems (CATS) at RPI: from Motion Control to Integrated Design”**

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Abstract

Opto-mechatronics system design considers interactions between optical, mechanical, and electronic components at the early stages of product conception. Through integrated modeling, design, and multi-disciplinary optimization, new level of performance can be achieved. This talk will present an example of the opto-mechatronics system development at the RPI CATS. First, a high performance motion control, which is required in most optomechatronics systems, is described. The motion control system is then incorporated into the design of a large field view microscope, called the adaptive scanning optical microscope (ASOM), which contains two active elements: a scanning mirror to increase the field of view and a deformable mirror to correct for the wavefront error. Simulation and experimental results will be presented to illustrate the overall approach.

About the Speaker

John Ting-Yung Wen received his B.Eng. from McGill University in 1979, M.S. from University of Illinois in 1981, and Ph.D. from Rensselaer Polytechnic Institute in 1985, all in Electrical Engineering. He worked on pulp and paper plant control at Fisher Controls from 1981-1982. From 1985-1988, he was a member of technical staff at the Jet Propulsion Laboratory where he worked on modeling and control for large space structures and space robots. Since 1988, he has been with Rensselaer Polytechnic Institute where he is currently a professor in the Department of Electrical, Computer, and Systems Engineering with a joint appointment in the Department of Mechanical, Aerospace, and Nuclear Engineering. He is also the director of a New York State sponsored interdisciplinary research center, the Center for Automation Technologies and Systems (CATS). He was an ASEE/NASA Summer Faculty Fellow in 1993, a Japan Society for the Promotion of Science (JSPS) Senior Visiting Scientist in 1997, and has received eleven NASA Tech Brief Awards. His research interest lies in modeling, control, and planning of dynamical systems with applications to vibration suppression, robot manipulation, biomedical systems, advanced material design, and network flow and power control. Dr. Wen is a Fellow of IEEE.

