



DEPARTMENT OF MECHANICAL ENGINEERING Purdue School of Engineering and Technology

FALL 2004 SEMINAR SERIES

Date: **Thursday, November 18, 2004**

Time: **11:00 am - 12:00 pm**

Room: **SL 165**

**Reception at 10:45 am (cookies and refreshments served)
Everyone is invited**

Virtual Training Environment for CNC Milling

Dr. Tamer Wasfy

President and Founder

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Abstract. A high-fidelity virtual training environment for CNC milling is presented. The environment provides access to a fully-functional virtual CNC milling machine, training on key operating procedures of the CNC machine, and lectures on CNC milling concepts and milling centers' design. The environment is driven by three integrated software modules, namely, a CNC Milling machine simulator, a virtual-environment display engine, and an intelligent-agent engine. The modules run on a single computer in a seamless web-based framework. The CNC milling machine simulator simulates the machine components, the manual controller interface, and the controller software. It also simulates the cutting process including cutting tool motion, in-process part geometry, cutting forces, machining sounds, and chip-formation. The virtual-reality engine displays a photo-realistic fully-interactive model of the CNC machine and plays the machine sounds. The intelligent-agent engine provides: step-by-step training of the machine operating procedures, a lecture delivery capability and a question/answer capability. In the last part of the seminar, examples of virtual-reality based visualization of dynamic finite element simulations of belt-drives, tires, and large-scale fluid-flow results will be presented.

About the Speaker. Dr. Tamer Wasfy is president and founder of Advanced Science and Automation Corp. He received a B.S. (1989) and an M.S. (1991) in mechanical engineering from the American University in Cairo, and a Ph.D. (1994) in mechanical engineering from Columbia University. Prior to his current position, he worked as a research scientist at Columbia University and at the University of Virginia/NASA Langley Research Center. Dr. Wasfy led the development of several software codes that are used by NASA and by automotive and aerospace companies. These include: a time-accurate finite element code for modeling flexible multibody systems and fluid flow and an object-oriented virtual-reality engine. He authored and co-authored over 50 conference and journal articles. His research interests include flexible multibody dynamics (including space-structures, belt-drives and tires), CFD, the finite element method, visualization of large-scale datasets, virtual reality, and intelligent software agents. He is a member of the ASME, AIAA, and SAE.