

“Reconfigurable Manufacturing Systems: The Role of Dynamics and Control”

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Abstract: We live in an engineered world, where technologies rapidly become obsolete, and which can easily be disrupted by external events such as world markets, disasters or political strife. Can engineers design systems that evolve in the face of such pressures, and develop technologies that can be reconfigured to the new circumstances? This talk introduces the principles behind reconfigurable manufacturing systems (RMS), which provide exactly the manufacturing functionality and capacity needed, exactly when needed. Examples are presented to highlight the role that dynamics and control plays in designing systems to be more reconfigurable. These examples include optimal capacity management in an RMS, dynamics of a reconfigurable machine tool, a reconfigurable stamping control system, as well as methods for co-design of an artifact and its controller and for component swapping modularity in controller design. The talk concludes with possible future trends in RMS research.

Biosketch: A. Galip Ulsoy is the C.D. Mote, Jr. Distinguished University Professor of Mechanical Engineering and the William Clay Ford Professor of Manufacturing at University of Michigan, Ann Arbor. He received the Ph.D. from University of California at Berkeley (1979), the M.S. degree from Cornell University (1975), and the B.S. degree from Swarthmore College (1973). His research interests are in the dynamics and control of mechanical systems. He has received numerous awards, including the American Automatic Control Council's 1993 O. Hugo Schuck Best Paper Award, the 2003 Rudolf Kalman Best Paper Award from the *J. Dynamic Systems, Measurement and Control*, the 2008 Albert M. Sargent Progress Award from SME, the 2008 Rufus T. Oldenburger Medal from ASME and the 2014 Hideo Hanafusa Outstanding Investigator Award in Flexible Automation. He is a member of the US National Academy of Engineering and is a Fellow of ASME, SME, IEEE and IFAC.



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