Workshop title:
Dynamics and Control of Microelectromechanical and Nanoelectromechanical Systems:
From Sensing to Imaging and Manipulation

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Founding Chair
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About the Speaker: Dr. Jalili obtained his BS and MS degrees from Sharif University of Technology, Tehran, Iran in 1992 and 1995 (both with first class honors), respectively, and his Doctorate in Mechanical Engineering from University of Connecticut (CT, USA) in 1998. He joined the faculty of Clemson University in August of 2000 from Northern Illinois University (DeKalb, Illinois) where he was a Visiting Assistant Professor. Dr. Jalili's research interests and expertise include precision mechatronics, system dynamics, vibration control, smart structures and piezoelectric-based actuators and sensors, micro and nanomechanical sensors and actuators, and control and manipulation at the nanoscale. He is now Associate Professor of Mechanical Engineering and Founding Director of Clemson University Smart Structures & NEMS Laboratory. Dr. Jalili is currently the Technical Editor of IEEE/ASME *Transactions on Mechatronics*, Associate Editor of ASME *Journal of Dynamic Systems, Measurement and Control*, founding Chair of ASME Dynamic Systems and Control Division (DSCD) Technical Committee on Vibration and Control of Smart Structures, past Chair and Vice-Chair of the Vibration and Noise Control Panel of the ASME DSCD, and member numerous ASME and IFAC technical committees at the national and international levels. Dr. Jalili was the General Program Chair for the 2007 ASME International Design Engineering Technical Conferences (2007 IDETC/CIE), a significant undertaking at such an international level.

Dr. Jalili is the author/co-author of more than 230 peer-refereed technical publications including 70 journal papers. Since joining Clemson in fall 2000, he has been ranked consistently as one of the top researchers and teachers in the College and ME Department. He is the recipient of many national and international awards including the 2003 National Science Foundation CAREER Award, 2002 Ralph E. Powe Junior Faculty Enhancement Award from Department of Energy, 2008, 2007, 2006, 2005, 2004 and 2003 Clemson University Board of Trustees Awards for Faculty Excellence in Research, 2008 Clemson University College of Engineering and Science Murray Stokley Award for Excellence in Teaching (the highest distinction given to engineering faculty at Clemson University), 2007 Clemson University College of Engineering and Science Collaboration Award, 2007 Clemson University Outstanding Young Investigator of the Year and 2007 Clemson University Graduate Student Government Award. Dr. Jalili is major advisor to 6 Best ASME Student Paper Finalists during past 8 years, and many Ph.D. and MS student awardees.

Course Overview:

Most nanotechnological applications require precise modeling, control and manipulation of different components and subsystems. One of the most important differences between "macroscale" and "nanoscale/microscale" control design is the added modeling uncertainties and nonlinearities at the nano/micro-scale. This added complexity combined with the sub-micron/nanometer precision requirement calls for the development of comprehensive dynamic modeling frameworks as well as new class of controllers. Along this line of reasoning and in an effort to respond to such demanding needs, the primary objectives of this workshop on "*Dynamics and Control of MEMS and NEMS*" are to present latest advances in this area as well as to stimulate future research directions in this field. Different nano/micro-scale control and manipulation techniques including scanning probe microscopy (SPM) systems (e.g., scanning tunneling microscopy–STM, atomic force microscopy–AFM, nanomechanical cantilevers–NMC) as well as nanorobotic manipulation will be discussed. The workshop will also discuss biological systems which are of interest to many researchers and engineers. A molecular level modeling of the interfacial adhesion, for example, is a necessary part of unraveling these phenomena and would be of tremendous potential benefit in associated applications such as rational drug design, molecular electronics, biomaterials development, or biosensor design.