

SFSU School of Engineering Seminar

“Mechatronic and Haptic Interfaces for Modeling, Rehabilitation and Augmentation of the Human Sensorimotor Control System”

Ozkan Celik

Mechanical Engineering Faculty Candidate



Wednesday, March 23

1:10 - 2 pm

SCI 256

Synopsis: *Haptic interfaces represent a special category of robotic systems, providing force feedback to the users within a physical human-robot interaction framework. In my talk, I will outline research projects I pursued at Rice University that involves the design, development, manufacturing, dynamic modeling and control of mechatronic and haptic interfaces for human sensorimotor control system modeling, rehabilitation and augmentation.*

During the seminar, I will discuss these topics: (1) My work in robotic rehabilitation of stroke patients, which shows robotic movement quality measures correlate strongly with clinical motor impairment measures of motor function recovery; (2) My project on design, modeling and control of tendon vibrators for inducing proprioceptive movement illusions with increased controllability and consistency; (3) My experience on mechanical design and control of wrist (RiceWrist) and arm (MAHI Exo II) exoskeletons for rehabilitation of persons who have suffered a cerebral vascular accident or incomplete spinal cord injury; (4) The labs I taught which involved use of haptic paddles: low cost, modular, single degree-of-freedom haptic interfaces. Throughout the lab sessions, students characterize and model different parts of the paddle. On the final lab session, haptic paddles are used for demonstrating haptic feedback with various virtual environments and bilateral teleoperation.

Speaker Bio: Ozkan Celik is a Ph.D. candidate in the Mechanical Engineering and Materials Science Department at Rice University, Houston, TX. He received the B.S. and M.S. degrees in Mechanical Engineering, with a specialization in System Dynamics and Control, from Istanbul Technical University, Turkey, in 2004 and 2006, respectively. He has been a Graduate Research and Teaching Assistant with the Mechatronics and Haptic Interfaces (MAHI) Laboratory since 2006. His research interests include robotics, system identification, modeling and control, mechatronics and haptics, particularly as applied to human sensorimotor control system modeling and augmentation, robotic rehabilitation, motor adaptation and learning. He is a member of IEEE, ASME, SfN, and has served as a reviewer for IEEE and ASME journals. Mr. Celik received a young researcher travel award at the 2009 IEEE International Conference on Rehabilitation Robotics (ICORR) and a best student poster award at the 2008 Annual Meeting of the National Center for Human Performance. His patent application on real-time differentiation algorithms for haptic interfaces is under review.

Refreshments will be served – come join us!

For inquiries, please contact Dr. Kwok Siong Teh at ksteh@sfsu.edu.