



International Conference on Robotics and Mechatronics
(/)

Keynote Speakers



Dr. Mahdi Tavakoli

Professor

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Profile (<http://www.ece.ualberta.ca/~mtavakol>)

Biography: Mahdi Tavakoli is a Professor in the Department of Electrical and Computer Engineering, University of Alberta, Canada. He received his BSc and MSc degrees in Electrical Engineering from Ferdowsi University and K.N. Toosi University, Iran, in 1996 and 1999, respectively. He received his PhD degree in Electrical and Computer Engineering from the University of Western Ontario, Canada, in 2005. In 2006, he was a post-doctoral researcher at Canadian Surgical Technologies and Advanced Robotics (CSTAR), Canada. In 2007-2008, he was an NSERC Post-Doctoral Fellow at Harvard University, USA. Dr. Tavakoli's research interests broadly involve the areas of robotics and systems control. Specifically, his research focuses on haptics and teleoperation control, medical robotics, and image-guided surgery. Dr. Tavakoli is the lead author of Haptics for Teleoperated Surgical Robotic Systems (World Scientific, 2008).

Speech Title: Closed-loop Control for Improving Needle Steering in Soft Tissue

Abstract: This presentation will demonstrate the potentials of robotics technologies for improving healthcare by enhancing needle-based surgeries and therapies. In permanent implant brachytherapy, needles loaded with radioactive seeds are used to reach planned locations in the prostate, where the seeds are deployed. Accurate seed placement is a key factor that influences the effectiveness of the procedure. However, current manual techniques can place seeds with an accuracy of only about 5 mm, which is a substantial error given the average prostate size. We will discuss mechatronic technologies for precisely steering a needle towards its intended location using feedback control. Closed-loop control of needle in tissue is challenging due to measurement errors, unmodelled dynamics created by tissue heterogeneity and motion of targets within the tissue, only to name a few. We will review recent progress made in this area including modelling needle-tissue interaction, sensing needle deflection, and controlling the needle trajectory.

Language

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