

Resilient Robots: Concept and Technology

Abstract: Resilient robots are relatively new in the field of robotics. In this talk, the speaker will first discuss the concept of resilience and resilient robots in particular with a focus on the difference of resilience from robustness. Then, the speaker will discuss an architecture of the under-actuated resilient robot and its benefit and some computational issues in operation management and control of the under-actuated resilient robot. Three developments of resilient robots will be illustrated. Finally, a generalized implication of the under-actuated resilient robot to a system that is composed of a group humans and a group of active machines and passive machines is discussed.



Biography. Dr. Zhang is a professor of University of Saskatchewan of Canada and a Chair Professor of East China University of Science and Technology of China under Chinese National 1000 Talent Plan. Dr. Zhang received his Ph.D. from Delft University of Technology (The Netherlands) in 1994 on the design theory and computer aided design of mechanism systems. He was then appointed as Assistant Professor of Manufacturing Engineering at City University of Hong Kong. In June 1998, he was appointed as Associate Professor in the Department of Mechanical Engineering at the University of Saskatchewan (Canada), and an Industrial Research Chair sponsored by Atomic Energy Canada Limited (AECL) to direct the research work at the Advanced Engineering Design Laboratory (AEDL) of the Department. He was also an adjunct professor at

University of Adelaide (Australia) during 2001 to 2006. Dr. Zhang was promoted to a Full Professor at the University of Saskatchewan in 2004.

Dr. Zhang has published over 400 refereed technical publications, among which over 237 papers appear in refereed journals in a broad scope of fields including design and mechatronics, manufacturing, informatics, human-machine systems. His h-index 40 (GS) and h-index 32 (Scopus). Dr. Zhang currently holds 8 patents. Dr. Zhang has supervised or co-supervised 31 PhD, 56 Master (thesis), 10 Master (non-thesis), and 37 Post-Doctoral Students or Visiting Scholars. Among the PhD students, 6 received NSERC PDF awards and 7 received faculty positions in post-secondary institutions in USA, Canada, Hong Kong, and China. This achievement has been recognized by both the university (2012 Distinguished Graduate Supervisor Award by University of Saskatchewan) and the professional realm (2014 Educator of the Year by Saskatoon Engineer Society). Dr. Zhang has been appointed as technical editor/associate editor for three reputed journals, including flagship journal, Journal of Mechatronics, IEEE Transaction on Mechatronics. He has been invited to review technical papers from 70 different journals, which cover design, mechatronics, informatics, management, material, and chemistry. He also served as Chair of Division of Biomedical Engineering at the U of S from 2007 to 2011, growing the division from 24 faculty members to 64 and 20 graduate students to over 60 (half of them on PhD study). Dr. Zhang is a fellow of ASME, senior member of IEEE, and senior member of SME.