Special Lecture

Date: March 15, 2024, Friday
Time: 11:00-12:00
Venue: Room 304, Ishikawadai 3rd building, O-okayama Campus, Tokyo Tech

Title: Experiences and challenges in medical devices

Speaker: Prof. Marco Ceccarelli

LARM2: Laboratory of Robot Mechatronics, Dept of Industrial Engineering, University of Roma Tor Vergata, Rome, Italy
Specially appointed professor, International Research Frontiers Initiative,
Tokyo Institute of Technology

LARM2 webpage: http://larmlaboratory.net e-mail: marco.ceccarelli@uniroma2.it

Abstract.
Challenges in Mechanism Design for robotic systems as medical devices in assistance of medical services can be considered from several viewpoints in technical, social, and financial ones as a new strongly emerging service field referring specifically to elderly people. In this keynote main issues are discussed in terms of Innovation aspects coming from Mechanism Design as specifically addressing the needs and requirements for surgical assistance and motion assistance of elderly people. The attention is focused on challenging aspects that are related to the mechanical structure and operation of motion assisting when considering tasks either in rehabilitating or helping elderly people in motion autonomy. The lecture presents aspects emphasizing the role of mechanism design in developments of medical devices as based on the fact that the action in performing tasks, either in coordination or not with nursery operators, is of mechanical nature due to motion and force transmission goals of the motion assistance. The challenges of mechanism design are presented both in terms of technical solutions and community activity, since each of them depends, impacts, and generates each other. Examples of past and current solutions are presented form the experience of the lecturer team to show how a mechanism design can be determinant for successful achievements in device conception and community developments. In particular, the activities at LARM2 in Rome are outlined on topics and systems as illustrative example from the direct experience of the speaker.

Keywords: Medical Devices, Robotics and Mechatronics, Mechanism Design, Motion Assistance, Elderly People Welfare

Marco Ceccarelli received his Ph.D. in Mechanical Engineering from La Sapienza University of Rome, Italy, in 1988. He is Professor of Mechanics of Machines at the University of Roma Tor Vergata, Italy, where he chairs LARM2: Laboratory of Robot Mechatronics.
His research interests cover subjects of robot design, mechanism kinematics, experimental mechanics with special attention to parallel kinematics machines, service robots, medical devices, mechanism design, and history of machines and mechanisms whose expertise is documented by several published papers in the fields of Robotics and Mechanism Design. He has been visiting professor in several universities in the world. He is IFToMM honorary member, ASME fellow and doctor honoris causa from several Universities. Professor Ceccarelli serves in several Journal editorial boards and conference scientific committees. He is editor of the Springer book series on Mechanism and Machine Science (MMS) and History of MMS. Professor Ceccarelli was the President of IFToMM, the International Federation for the Promotion of MMS. He has published several papers and has several patents. He has started several IFToMM sponsored conferences including MEDER (Mechanism Design for Robotics) and MUSME (Multibody Systems and Mechatronics).