

Title: Robotics for Rehabilitation

(Please, remember to use code **3225y** to submit a paper to this Special Session)

Objectives and Motivation

In an increasingly connected world, robotics and automation have assumed a leading role in different facets of our society, and there is a need for productive collaboration and interaction between robots and humans. The main focus of this special call on robotics for rehabilitation is on the robot's science and systems aspects that are needed to interact, assist and cooperate with humans. The aim of this special call is to understand this topic from multiple perspectives: (i) physical and social interaction with humans; (ii) robot adaptation to a patient's performance during rehabilitation; (iii) human-robot interaction safety; iv) control strategies that enhance human-robot synergies; and v) assessment standards and tools for rehabilitation robotics.

The special call is intended for researchers from areas spanning robotics, biomechanics, human-robot interaction, assistive and rehabilitation robotics, robotic systems design, field robotics, wearable robotics, biomedical and clinical domains. This special session will foster multidisciplinary discussion and consolidation of perspectives, methodologies and assessment tools to align and benefit research efforts in robotics for rehabilitation.

List of Topics

- Rehabilitation robotics
- Surgical robotics
- Prosthetics
- Applications and challenges in rehabilitation robotics
- Human performance restoration and augmentation
- Physical and social interaction among robots and humans
- User-centered design models and approaches
- Wearable robotics systems
- Safety-compliant robot systems
- Performance metrics and benchmarking
- Safety aspects in collaborative robotics

Corresponding Keywords

Assistive robots, biomimetic robot actuators, exoskeletons, rehabilitation robotics, safe human-robot interaction

Organizers

1. Dr. Vineet Vashista, Assistant Professor, IIT Gandhinagar, India, vineet.vashista@iitgn.ac.in

Bio: Vineet Vashista is an Assistant Professor at the Indian Institute of Technology (IIT), Gandhinagar. He received a Ph.D. degree in Mechanical Engineering from Columbia University, New York (USA) in 2015 and Master of Technology in Mechanical Design from IIT Delhi, New Delhi in 2008. Dr. Vashista currently heads the Human-Centered Robotics Laboratory at IIT Gandhinagar. He was awarded the DST INSPIRE faculty award in 2016 and SERB Early Career Research Award in 2017.

Dr. Vashista's research interests are in the areas of rehabilitation robotics, wearable robotics, cable-driven robots, and human movement adaptation.

2. Dr. Neelesh Kumar, Principal Scientist, CSIR-CSIO, Chandigarh, India, neel5278@csio.res.in

Bio: Neelesh Kumar is working as Principal Scientist in Biomedical Instrumentation Unit of CSIR-Central Scientific Instruments Organisation Chandigarh. His areas of interest are techniques of gait assessment, sensor development, design and development of assistive devices and methods to quantify rehabilitation. He is versed with application of prosthetic biomechanics for development robotic rehabilitation and virtual reality based rehabilitation.

3. Dr. Chemori Ahmed, Research Scientist, French National Center for Scientific Research (CNRS), Montpellier Laboratory of Computer Science, Robotics and Microelectronics (LIRMM), Ahmed.Chemori@lirmm.fr

Bio: Ahmed Chemori is currently a tenured research scientist in Automatic control and Robotics for the French National Center for Scientific Research (CNRS), at the Montpellier Laboratory of Computer Science, Robotics and Microelectronics (LIRMM). His research interests include nonlinear (adaptive and predictive) control and their applications in under actuated and parallel robotics, humanoid robotics and wearable robotic).