



## **ICIRA 2023 Special Session Proposal**

### **Title of the Proposal: Wearable Robots for Assistance, Augmentation and Rehabilitation of human movements**

#### **Technical Outline of the Session and Topics:**

Outline of the Session: This proposed session aims at presenting the latest research advances and the future trends in the development of human-centered based approaches for controlling wearable robots for motion assistance and rehabilitation. While initially conceived for human motion augmentation purposes, wearable powered robots have been gradually proposed as technological aids for rehabilitation and assistance, and functional substitution in patients suffering from motor disorders. Over the last decades and despite the significant technological and scientific achievements in the field of wearable technologies, we have not yet witnessed successful projects pointing out subject-centered robotic suits, which are easy to wear and intuitive enough to cooperate with. Providing such pragmatic solutions or reducing the wearer dependency on external operator would have a great societal impact by improving the quality of life and regaining people Independence. In addition, technological advances and the emergence of wearable and ubiquitous technologies with considerable reduction in size, cost and energy consumption, are becoming privileged solutions to provide autonomous assistive services to humans. This challenging technology is expected to work closely, interact and collaborate with people in an intelligent environment. Thus, communicating the human body with the wearable robotic system requires robust and suitable interfacing solutions. This session will provide discussions about the state of the art, challenges and limiting factors for developing sustainable wearable robots for assistance, augmentation and rehabilitation of human movements in real-life scenarios. It will highlight particularly issues related to novel kinematics and actuation solutions for wearable robots as well as the growing challenges of using novel human-robot multimodal interaction paradigms. Issues related to cognitive/physical human robot interactions, will be also treated.

#### **Topics of the Session:**

- *Exoskeletons, exosuits, actuated orthoses and prostheses;*
- *Supernumerary robotic limbs;*
- *Neuro-robotics, neuro-prostheses and neuro-rehabilitation;*
- *Neurological Disorders and Rehabilitation;*
- *Mechatronic design and control of human movements;*

- *Cognitive/physical interaction paradigms for wearable robotics;*
- *Human–robot multimodal interaction paradigms;*
- *Bioinspired design;*
- *Human-centered design;*
- *Textile and apparel design for wearable robotics;*
- *Functional, biomechanical and physiological evaluations*
- ...

#### **Contact details of the Session Organizers**

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