

A Workshop proposal for the

# IEEE International Symposium on Robot and Human Interactive Communication (IEEE RO-MAN 2016)

New York, USA, August 26-31, 2016.

## **Title**

*2nd Workshop on Human-Oriented Approaches for Assistive and Rehabilitation  
Robotics (HUMORARR 2016)*

## **Format**

*Workshop, full day*

## **Main organiser**

*Philipp Beckerle  
Institute for Mechatronic Systems in Mech. Eng., Technische Universität Darmstadt  
Otto-Berndt-Str. 2  
64287 Darmstadt, Germany  
+49 6151 16 23256  
beckerle@ims.tu-darmstadt.de*

## **Co-organisers**

*Gionata Salvietti  
Siena Robotics and Systems Lab, University of Siena  
via Roma 56  
53100 Siena, Italy  
Fax +39 0577 233609*

*Ramazan Ünal  
Currently no affiliation  
unalramazan@gmail.com*

## **Statement of objectives – intended audience**

*Recently, assistive and rehabilitation robotics receive an increasing research interest due to their capabilities in evaluation, augmentation, and their high repeatability. Even though designs have the functionality for desired tasks, many robotic interventions suffer from being effective not only due to the limitation in technology but also the insufficient knowledge about the human. Thus, assistive and rehabilitation robotics research and application require human-oriented approaches since the*

*devices incorporate with humans. Therefore, the consideration of technical and human aspects is crucial and techniques from neural and human sciences should be considered besides engineering methods. The consideration of aspects such as safety, functionality, effectiveness, and acceptance requires the collaboration of disciplines like design, mechatronics, computer science, biomechanics, neuroscience, and psychology. Besides supporting the way to a systematic framework to consider human issues in development and operation, this 2nd edition of the workshop will focus on aspects of human-robot interaction and interface technologies.*

*The proposed workshop will gather knowledge from the disciplines mentioned above with respect to human-oriented approaches in assistive and rehabilitation robotics. Invited speakers will include a mixture of experts working on assistive/rehabilitation robotics and/or human-robot interaction and thereby appropriately focus on the interrelation of those fields.*

*The intended audience is expected to cover all fields mentioned above and is intentionally meant to be multidisciplinary. Besides the invited talks, the organizers will call for posters to be presented within the workshop.*

### **List of speakers**

*The full day workshop will be organized in four sessions of 90 minutes. Each session will consist of 45 minutes of talks, either individual ones (15 minutes) or tandem talks of two researchers (30 minutes). The speakers will be experts from human-robot interaction and/or assistive/rehabilitation robotics. In both cases, the speakers will be asked to tackle a specific research issue from their perspective to stimulate an extensive interactive discussion of up to 30 minutes. Thereby, we want to foster interdisciplinary exchange and fruitful discussions within the workshop involving the audience. At the end of each session, a spotlight presentation of the accepted posters will be presented before they can be discussed in the coffee break. A call for posters will be put on the workshop webpage (<https://humorarr.wordpress.com/>) and send to newsletters like robotics worldwide or euRobotics\_dist. For the proceedings, abstracts (A4 size, 1page) will be collected and integrated from the invited speakers as well as the poster presenters.*

#### *Human-Robot Interaction (HRI)*

*2 sessions with 45min talks, 30min discussion, 15min poster spotlight*

*HRI.1: Domenico Prattichizzo (UNISI/IIT) with Simone Rossi (UNISI): "Robotic compensating tools to regain grasping capabilities in chronic stroke patients" (tandem talk, 30min)*

*HRI.2: Claudio Castellini or Markus Nowak (DLR): "Assessing functionality of upper-limb amputees while using pattern matching and interactive learning" (individual talk, 15min)*

*HRI.3: Sandra Hirche and Satoshi Endo (TUM): "Neuroscientific principles of risk-sensitive control and its application in human-robot interaction" (tandem talk, 30min)*

*HRI.4: Heni Ben Amor ASU: "Learning Interaction Primitives for Collaborative and Assistive Robots" (individual talk, 15min)*

*Assistive and Rehabilitation Robotics (ARR)*

*2 sessions with 45min talks, 30min discussion, 15min poster spotlight*

*ARR.1: Ferdinando Mussa-Ivaldi (NWU): "Rehabilitation vs. Assistance: Fitting Diverse Goals within One Tool" (individual talk, 15min)*

*ARR.2 Fulvio Mastrogiovanni (UNIGE) and Brenna D. Argall (NWU): "The Intersection of Robot Skins and Rehabilitation" (tandem talk, 30min)*

*ARR.3 Juan Moreno (SNRC): "Human-robot interaction in wearable exoskeletons for gait rehabilitation" (individual talk, 15min)*

*ARR.4 Jose Gonzalez (SNRC): "Control of human locomotion using neuromuscular primitives" (individual talk, 15min)*

*ARR.5 Dirk Lefeber (VUB): "Human-Oriented Approach in the design of the MIRAD and BIOMOT lower limb exoskeletons" (individual talk, 15min)*

### **List of topics**

- *Technical developments in human-robot interaction and interfaces (design, control, sensors, actuators, user feedback, etc.)*
- *Investigations of the neural and psychological background*
- *Methodical approaches to human-oriented design and suitable design criteria (safety, functionality, effectiveness, acceptance requirements, etc.)*
- *Structured assessment of intervention effectiveness in user studies*
- *Applications in prostheses, exoskeletons, and other wearable robotics*