The MUNDUS Project has organized a Pre-Conference Workshop, “WP5-Challenges for Human Centered assistive neuro-robotic devices: the experience of the Mundus project” which will take place during the first International Conference on Neuro-rehabilitation ICNR2012 in Toledo, Spain on November 13 from 9.00 to 13.00.


Organizers

Alessandra Pedrocchi, Politecnico di Milano, Dept. Bioengineering, Neuroengineering and medical robotics laboratory.
Giancarlo Ferrigno, Politecnico di Milano, Dept. Bioengineering, Neuroengineering and medical robotics laboratory.

Bio-sketch of organizers

Giancarlo Ferrigno received the M.Sc. degree in electronic engineering and the Ph.D. degree in bioengineering from Politecnico di Milano.
He is Full Professor in the Bioengineering Department at Politecnico di Milano, Italy, where he teaches Biomedical Instrumentation and Medical Robotics and Technologies in Surgery. He is the Director of the Neuroengineering and Medical Robotics Laboratory and is responsible for several projects funded by Italian Space Agency, industrial partners and FP7 EU grants.
He is coauthor of more than 100 peer reviewed journal papers and 16 patents.
His research interests are related to spatial localization technologies, motor control, neuroprostheses, bio-artificial interfaces, computer-aided surgery, and medical robotics.

Alessandra Pedrocchi has a Master degree in Electrical Engineering (1997) and obtained a PhD degree in Bioengineering in 2001 from the Politecnico di Milano. Since June 2008, she has been assistant professor in tenure track in the Department of Bioengineering at the Politecnico di Milano where she teaches Neuroengineering on the Master of Science in Bioengineering. Her research activities are carried on at the NearLab in the field of biomechanics in motor control, neuroengineering and neurorehabilitation (www.biomed.polimi.it/nearlab). She is Project Manager of MUNDUS project (FP7 ICT-2009.7.2) and the Politecnico PI for REALNET project (FP7 Obj. ICT-2009.6).

Program

Alessandra Pedrocchi - Neuroengineering and medical Robotics laboratory, NearLab, Politecnico di Milano, Bioengineering Dept. - “The MUNDUS project: concept, goals, challenges and achievements”.
Simona Ferrante - Neuroengineering and medical Robotics laboratory, NearLab, Politecnico di Milano, Bioengineering Dept. - “Biomimetic neuroprostheses modulated on subject’s residual motor capabilities”.

Franco Molteni-Villa Beretta rehabilitation Centre- Valduce Hospital “Clinical Impact of innovative neuroprothesis on Activities of Daily Living (ADL). First set of Users evaluations”.

Christian Klauer - Control Systems Group Technical University of Berlin “Design of feedback control strategies for an arm neuroprothesis combined with an exoskeleton”.


Javier Pascual - Machine Learning Group, Computer Science Faculty, Berlin Institute of Technology, Berlin, Germany “Towards Brain-Computer Interface Controlled Neuroprostheses”.

Maria Bulgheroni - Ab.Acus srl “RFID technology for objects recognition and their position estimation” Margit Gfohler - Vienna University of Technology, Austria “Development of a lightweight exoskeleton with weight compensation for the upper extremity as an assistive device for activities of daily living.”

Andreas Jedlitschka - Fraunhofer Institute for Experimental Software Engineering (IESE) “How to systematically evaluate system quality criteria using data stemming from various sensors?”.

Description

The workshop will provide a detailed picture of all the modules of the system and the advances achieved in the seven proposed objectives:
01 Integrate sensors, actuators and NP to restore and/or augment capabilities of disabled people.
02 Exploit ICT methods for developing a new generation of arm NP.
03 Advance current BCI systems by extracting linear control information evolving with the pathology and including NMES for BCI training.
04 Develop light, passive arm exoskeleton for gravity compensation.
05 Advance current AT devices by adding environment based hand assistance.
06 Advance in multimodal, adaptive control and self-learning approach.
07 Evaluate acceptability by end-users in home and work scenarios.

Possible hands-on sessions with single modules of the system easy to be moved will be prepared.

List of speakers

Alessandra Pedrocchi has a Master degree in Electrical Engineering (1997) and obtained a PhD degree in Bioengineering in 2001 from the Politecnico di Milano. Since June 2008, she has been assistant professor in tenure track in the Department of Bioengineering at the Politecnico di Milano where she teaches Neuroengineering on the Master of Science in Bioengineering. Her research activities are carried on at the NearLab in the field of biomechanics in motor control, neuroengineering and neurorehabilitation (www.biomed.polimi.it/nearlab). She is Project Manager of MUNDUS project (FP7 ICT-2009.7.2) and the Politecnico PI for REALNET project (FP7 Obj ICT-2009.6).

Simona Ferrante is a Research Fellow at the Bioengineering Department of the Politecnico di Milano. She received a MS degree in biomedical engineering in 2002 and a PhD degree in Bioengineering in 2006 from the Politecnico di Milano. She currently works at the Neuroengineering and medical robotics Laboratory (NearLab, www.biomed.polimi.it/nearlab) in the field of
biomechanics in motor control, neuroengineering and neurorehabilitation. Her research interests are related to the
development of novel treatment in the rehabilitation of neurologic patients, in the quantitative assessment of motor recovery.
She is author of about 15 papers in peer-reviewed international journals.

Franco Molteni MD received medical degree from the University of Milan, where he became board certified in Physical
Medicine and Rehabilitation in 1984.
He is Head of the Valduce Hospital Villa Beretta Rehabilitation Center in Costa Masnaga, Italy, a rehabilitation clinic specialises
in the treatment of people with traumatic brain injury, stroke, spinal cord injury, neuromuscular and neurodegenerative
disease.
He is also Director of Gait&Motion Analysis Lab at Valduce Hospital.
Internationally Dr. Molteni is actively involved in clinical research about use of advance technologies in rehabilitation. He is
author of numerous scientific articles and book chapters on this subjects.

Javier Pascual, received his Ph.D. in computer science from the Universitat Politècnica de Catalunya (Barcelona, Spain) in
2003. After working some years in R&D, he began in 2010 a PhD thesis in Brain Computer Interfaces at the Machine Learning
Group in the Technische Universität Berlin within the European research project MUNDUS (http://www.mundus-project.eu). His
research focus is on the use of different BCI paradigms to control neuroprostheses, as well as the use of FES to cope with the
BCI illiteracy problem.

Maria Bulgheroni, electronic engineer. She is Ab.Acus R&D Director. Since 1995, she was in charge of R&D management for
research and clinical centres and private companies. Main research fields are assistive technology, reaching and grasping
biomechanics, home rehabilitation. Among the most recent activities: FP7 SMILING project aimed at walking rehabilitation and
falls prevention in eldery; detection of social intention in reaching and grasping at University of Padua; fetal movements
analysis at Ospedale per l'Infanzia di Trieste; NavigAbile project for the development and testing of Augmentative and
Alternative Communication tools; member of the SIVA portal editorial board about disability and aids.

Margit Gföhler is an associate professor for biomechanics at the Vienna University of Technology, Austria. She studied
mechanical engineering at the TU Vienna and the University of Illinois at Urbana Champaign, US, and received a PhD in
mechanical engineering from the TU Vienna in 1995. In 2001 she finished her habilitation in the field of biomechanics.
Margit Gföhler's research interests are in modeling and simulation of human movement, rehabilitation engineering and
cardiovascular engineering.

Christian Klauer studied electrical engineering at the Technische Universität Berlin. Since 2010 he has been working towards
his PhD thesis in the field of feedback control of neuro-prostheses at TU Berlin within the European research project MUNDUS
(http://www.mundus-project.eu). His research focus is on the use of different sensor technologies like inertial motion units and
electromyography to simplify and robustify the design of control systems and to improve control performance. Beside
research in systems and control theory, he is developing open source software tools for design and implementation of real-
time control systems.

Silvestro Micera received the University degree (Laurea) in Electrical Engineering from the University of Pisa, in 1996, and the
Ph.D. in Biomedical Engineering from the Scuola Superiore Sant'Anna, in 2000. From 2011 he is Associate Professor at the
Ecole Polytechnique Fédérale de Lausanne (EPFL), CH. In 2009 he was the recipient of the “Early Career Achievement Award”
of the IEEE EMB Society.
His research interests include the development of neuroprostheses and robotic systems for function and assessment
restoration in disabled and elderly persons. He is author of more than 70 ISI scientific papers and several international patents.

Andreas Jelitchscha holds a PhD in computer science. He has experience in project management from several European
projects under FP5, FP6, and currently under FP7. His research interests are behaviour modelling and reasoning, decision
support, and empirical evaluation. Dr. Jedlitschka authored numerous scientific papers and is member of the several Program Committees as well as of the German Gesellschaft für Informatik e.V. (GI) and its working group on artificial intelligence. Within the European project MUNDUS, his research focus is on environmental sensors, sensor data fusion, and how to use these data for the purpose of system evaluation.

Registration

www.icnr2012.org/Registration

For further details, please visit the following link:
http://www.mundus-project.eu/component/content/article/36-icnr-2012

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