XXIV CONGRESSO NAZIONALE

# SIAMOC 2024

Società Italiana di Analisi del Movimento in Clinica

2-5 Ottobre

Stresa (VB)

Presidente
Marco Godi

# PATROCINI

PROVINCIA VERBANO CUSIO OSSOLA

CITTÀ DI STRESA

DISTRETTO TURISTICO DEI LAGHI
Lago Maggiore
Lago d'Orta
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Istituti Clinici Scientifici Maugeri

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ASSOCIAZIONE ITALIANA di FISIOTERAPIA

TECNOLOGIE DIGITALI NIS | A.I.F.I.

fisioterapia neurologica & neuroscienze

## COMITATO ORGANIZZATIVO

***Marco Godi*** *– ICS Maugeri IRCCS, Veruno (NO)*
***Marica Giardini*** *– ICS Maugeri IRCCS, Veruno (NO)*
***Ilaria Arcolin*** *– ICS Maugeri IRCCS, Veruno (NO)*
***Stefano Corna*** *– ICS Maugeri IRCCS, Veruno (NO)*

## COMITATO SCIENTIFICO

***Ilaria Arcolin*** *– ICS Maugeri IRCCS, Veruno (NO)*
***Valeria Belluscio*** *– Università Foro Italico, Roma*
***Stefano Filippo Castiglia*** *– Sapienza Università di Roma*
***Andrea Cereatti*** *– Politecnico di Torino*
***Paolo De Blasiis*** *– Università degli Studi della Basilicata, Potenza*
***Beatrice De Maria*** *– ICS Maugeri IRCCS, Milano*
***Roberto Di Marco*** *– Università di Verona*
***Francesco Di Nardo*** *– Università Politecnica delle Marche, Ancona*
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***Marco Godi*** *– ICS Maugeri IRCCS, Veruno (NO)*
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***Mariano Serrao*** *– Sapienza Università di Roma*
***Monica Sicari*** *– ALS TO5, Torino*
***Fabiola Spolaor*** *– Università di Padova*
***Rita Stagni*** *– Alma Mater Studiorum Università di Bologna*

# SIAMOC 2024

*È con entusiasmo che la "perla del lago Maggiore", Stresa, si prepara ad accogliere il congresso annuale della Società Italiana di Analisi del Movimento in Clinica (SIAMOC), giunto alla sua ventiquattresima edizione. Il congresso, itinerante, vanta l'avere avuto sede nelle principali città italiane, tra cui lo scorso anno nella Capitale.*

*È l'occasione di ritrovo dei membri della società SIAMOC, il cui intento è quello di progredire nella ricerca scientifica del movimento umano, con un'interazione tra il mondo clinico e quello universitario, nella sinergia delle diverse figure professionali. In ogni edizione i ricercatori hanno la possibilità di condividere il loro recente lavoro e di formarsi nella conoscenza di quello altrui, anche grazie agli ospiti che tengono le lezioni magistrali. Infatti, professori internazionalmente selezionati, sono invitati ad intervenire con i loro contributi di altissimo livello.*

*A questo quadro di valore scientifico, sarà quindi Stresa e il suo territorio circostante a fare da cornice. Piccola, poco conosciuta rispetto alle città capoluogo, ma così caratteristica e suggestiva, Stresa può essere davvero scoperta come la perla che è, racchiusa dalle montagne e affacciata sul lago e sulle sue isole.*

***"Più grande è il paesaggio, più piccolo è l'uomo"***

*scriveva Dumas padre, dopo essere rimasto incantato dal paesaggio di Stresa e del suo Lago Maggiore.*
*Con l'augurio di potersi sentire piccoli e salire così insieme sulle spalle dei giganti, vi aspettiamo a Stresa per il Congresso SIAMOC 2024!*

*Il Presidente*
*Marco Godi*

# ANALISI BIOMECCANICA NEL RUNNING PER IL TRATTAMENTO DEGLI INFORTUNI

## WORKSHOP MERCOLEDI' 2/10

**Silvia Fantozzi**
**Davide Vallesio**

10.00 Registrazione Incontri pre-congressuali

11.00 **Presentazione e introduzione del workshop**

**11.10** **Biomeccanica in laboratorio: l'uso di pedane di forza e stereofotogrammetria per l'analisi della corsa**
Silvia Fantozzi

**11.40** **Ground Reaction Forces: come possiamo modularle e quali implicazioni hanno su performance e prevenzione infortuni? Il ruolo della forza e del ROM**
Davide Vallesio

**12.00** **Tecnologie indossabili per l'analisi della corsa sul campo: sensori inerziali e di pressione**
Silvia Fantozzi

**12.35** **Su quali parametri cinematici o cinetici è possibile agire per migliorare l'efficienza della corsa?**
Davide Vallesio

13.00 Pausa

**14.00** **Le scarpe da running: come il progresso tecnologico modifica la biomeccanica della corsa?**
Silvia Fantozzi, Davide Vallesio

**14.45** **Attività pratica: valutazione biomeccanica di due runner su treadmill**
Silvia Fantozzi, Davide Vallesio

16.00 Conclusione del workshop

# INTELLIGENZA ARTIFICIALE NELL'ANALISI CLINICA DEL MOVIMENTO: QUANDO PUÒ ESSERE UTILE?

## CORSO MERCOLEDI' 2/10

**Valentina Agostini**
**Marco Ghislieri**
**Francesco Marenco**

10.00 Registrazione Incontri pre-congressuali

11.00 **Presentazione e introduzione del corso**

**11.10** **Intelligenza artificiale, machine learning, deep learning**
Valentina Agostini

**11.30** **"Big data" nell'analisi del movimento: il necessario input dell'IA**
Valentina Agostini

**11.50** **Applicazioni cliniche e prospettive di ricerca: quando l'IA può essere utile?**
Valentina Agostini

**12.10** **Dibattito: explainability, integrazione della pratica clinica, questioni etiche**
Valentina Agostini, Francesco Marenco

13.00 Pausa

**14.00** **Pipeline per la costruzione e validazione di un modello IA per l'analisi clinica del movimento**
Marco Ghislieri

**14.30** **Attività pratica. Dall'acquisizione dei segnali alla valutazione del modello**
Valentina Agostini, Marco Ghislieri, Francesco Marenco

16.00 Conclusione del corso

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# MERCOLEDI' 2/10

16.00 Registrazione Congresso

17.00 **Cerimonia di apertura**

**17.30 LEZIONE MAGISTRALE 1**
*Chairman: Ugo Della Croce*

**How humans evolved to first walk and then run, and why it matters**

**Prof. Daniel E. Lieberman**
*Edwin M. Lerner II Professor of Biological Sciences; Chair of the Department of Human Evolutionary Biology at Harvard University*

Discussione

18.45 Cocktail di benvenuto

20.00 Conclusione della giornata

# GIOVEDI' 3/10

08.00 Registrazione Congresso

08.45 **Saluti e apertura del Presidente del Congresso**

## 09.00 PRESENTAZIONI ORALI 1
## Sport Science: Integrating Technology and Human Performance

*Chairs: Valeria Belluscio, Marco Caruso*

### Fatigue-induced neuromuscular alterations in single-leg hop for distance jumps suggest an increased risk of anterior cruciate ligament injury

**M. Nardon[a], M. Zanoni[b], M. Bartesaghi[a], A. Zaza[c], C. Perin[d], C. Alessandro[a]**

*[a]School of Medicine and Surgery / Sport and Exercise Medicine, University of Milano-Bicocca, Monza, Italy; [b]Department of Life Sciences / Division of Sport, Health and Exercise Sciences, Brunel University London, Uxbridge, United Kingdom; [c]Department of Biotechnology and Biosciences / Sport and Exercise Medicine, University of Milano-Bicocca, Milan, Italy; [d]School of Medicine and Surgery / Physical and Rehabilitative Medicine, University of Milano-Bicocca, Monza, Italy*

### An inertial-based method to characterize response to footwear features

**R. Rossanigo[a,b], C. Agresta[c], S. Bertuletti[d], B. Utzeri[d], J. Zendler[e], V. Camomilla[f], A. Cereatti[d]**

*[a]University of Sassari, Sassari, Italy; [b]NeuroRehab Research Center, Lausanne University Hospital (CHUV), Lausanne, Switzerland; [c]University of Washington, Seattle, Washington, USA; [d]Politecnico di Torino, Turin, Italy; [e]Rimkus Consulting Group, Houston, Texas, USA; [f]University of Rome Foro Italico, Rome, Italy*

### The impact of sports training on the Spinal Cord Injury individual's balance: the PITS project

**C. Chieffo[a], G. Chini[a], T. Varrecchia[a], I. Gennarelli[b], A. Silvetti[a], V. Molinaro[a], I. Poni[c], A. Mariotti[c], S. Tiberti[d], A. Tamburro[d], A. Toscano[c], A. Ranavolo[a]**

*[a]INAIL, Monte Porzio Catone, Italy; [b]IIT, Genova, Italy; [c]Centro Protesi INAIL, Rome, Italy; [d]ASL Roma 2, Rome, Italy.*

### Evaluation of WIMU sensor performance in estimating running stride time and vertical stiffness: a comparison with smart pressure insoles

**S. Pinelli[a], M. Mandorino[b], M. Lacome[b], S. Fantozzi[c]**

*[a]Department for Life Quality Studies, University of Bologna, 47921 Corso D'Augusto 237, Rimini, Italy; [b]Performance and Analytics Department, Parma Calcio 1913, Parma, Italy; [c]Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi", University of Bologna, Bologna, Italy*

### Effects of acoustic and visual stimuli on Countermovement jump performance in volleyball players evaluated by Inertial Measurement Unit

**C.I. De Girolamo [a], A. Fullin [a], M. Trucillo [b], A. Lucariello [c], A. De Luca [b], P. De Blasiis [d]**
*[a] Department of Advanced Biomedical Sciences, University of Naples "Federico II", Naples, Italy; [b] Department of Mental and Physical Health and Preventive Medicine, Section of Human Anatomy, University of Campania "Luigi Vanvitelli", Naples, Italy; [c] Department of Sport Sciences and Wellness, University of Naples "Parthenope", 80100, Naples, Italy; [d] School of Engineering, University of Basilicata, 85100 Potenza, Italy*

### Estimation of joint moments during ball throwing in simulated altered gravity conditions using a musculoskeletal modelling approach: preliminary results

**A. Pica[a], I.G. Porco [a], E. Zimei [a], E. Braccili [a], S.M.G. Solinas [a], P. Picerno [a], U. Della Croce [a]**
*[a] Department of Biomedical Sciences, University of Sassari, Sassari, Italy*

## 10.15 LEZIONE MAGISTRALE 2

*Chair: Andrea Cereatti*

### The global-local dilemma in rehabilitation. Does attention to detail prevent consideration of the person?

**Prof. Derick Wade**
*Consultant in Neurological Rehabilitation and Visiting Professor at Oxford Brookes University, UK*

Discussione

11.15 Coffee break

## 11.45 PRESENTAZIONI ORALI 2
## Innovations in Mobility Assessment

*Chairs: Ilaria Arcolin, Roberto Di Marco*

### Influence of walking path length on 2-minute walk test gait parameters in healthy young adults

**C. Lo Zoppo [a], V. Belluscio [a], G. Vannozzi [a]**
*[a] University of Rome "Foro Italico", Rome, Italy*

### From development to deployment: introducing MobGap, the open-source tool for mobility assessment with wearable devices by Mobilise-D

**P. Tasca [a], A. Küderle [b], C. Kirk [c], C. Hinchcliffe [c], D. Megaritis [d], A. Stihi [e], B. Caulfield [f], L. Rochester [c], A. Cereatti [a]**
*[a] Politecnico di Torino, Turin, Italy; [b] Friedrich-Alexander-Universität, Erlangen-Nuremberg, Germany; [c] Newcastle University, Newcastle, United Kingdom; [d] Northumbria University Newcastle, Newcastle, United Kingdom; [e] University of Sheffield, Sheffield, United Kingdom; [f] University College Dublin, Dublin, Ireland*

## Instrumented Timed Up and Go Test: a reliable tool for elderly with femur fracture

**S. Baracco [a], I. Arcolin [a], S. Corna [a], M. Godi [a], M. Giardini [a]**
*[a] Istituti Clinici Scientifici Maugeri IRCCS, Department of Physical and Rehabilitation Medicine Unit, Institute of Veruno, Italy*

## Validation of a new method for center of mass trajectory estimation in simulated daily life activities based on inertial and barometric pressure data fusion

**A. Audisio [a], D. Fortunato [a], P. Tasca [a], M. Caruso [a], A. Cereatti [a]**
*[a] Polytechnic University of Turin*

## Reliability of average daily steps measured through a consumer smartwatch in people with Parkinson's disease across disease severity and subtypes

**E. Bianchini [a,b], D. Rinaldi [a], P. Pacilio [a], C. Hansen [c], F.E. Pontieri [a], N. Vuillerme [b,d]**
*[a] Department of Neuroscience, Mental Health and Sensory Organs (NESMOS), Sapienza University of Rome, Rome, Italy; [b] AGEIS, Université Grenoble Alpes, Grenoble, France; [c] Department of Neurology, Kiel University, Kiel, Germany; [d] Institut Universitaire de France, Paris, France*

## Clinical and instrumental gait phenotyping in subjects with GLUT-1 deficiency syndrome

**I. Campese [a], M. Corrado [a,b], V. Grillo [a,b], B. Agostini [a,b], V. Vacchini [c], C. Varesio [a,c], M. Celario [a,c], D. Trabassi [d], S.F. Castiglia [a,d], M. Serrao [d], C. Tassorelli [a,b], V. De Giorgis [a,c], R. De Icco [a,b]**
*[a] Movement Analysis Research Section, IRCCS Mondino Foundation, Pavia, Italy; [b] Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; [c] Department of Child Neurology and Psychiatry, IRCCS Mondino Foundation, Pavia, Italy; [d] Department of Medical and Surgical Sciences and Biotechnologies, "Sapienza" University of Rome, Polo Pontino, Latina, Italy*

## A graph-based approach to study motor coordination in Parkinson's Disease gait: a longitudinal study to assess the effectiveness of Deep Brain Stimulation neurosurgery

**L. Locoratolo [a], M. Ghislieri [a], F. Sciscenti [a], M. Lanotte [b], L. Rizzi [b], V. Agostini [a]**
*[a] PolitoBIOMed Lab, Dept. of Electronics and Telecommunications, Politecnico di Torino, Turin, Italy; [b] Department of Neuroscience "Rita Levi Montalcini", University of Turin, Turin, Italy*

13.15 Light lunch

## 14.15 LEZIONE MAGISTRALE 3
*Chair: Rita Stagni*

### Beyond Markers: Unveiling Human Motion Through Markerless Video Analysis

**Prof.ssa Maura Casadio**
*Associate Professor in Biomedical Engineering at the University of Genoa, Italy*

Discussione

## 15.15 Poster Metodologici 1
*Chairs Panic Session: Elena Bergamini, Simone Guglielmetti*

**ID#1** **Design and validation of a novel accelerometer-based test for the assessment of the sensorimotor control of the shoulder**

**P. Picerno [a], M. Bravi [b], F. Santacaterina [c], E. Iuliano [d], M. Germanotta [e]**
*[a] Department of Biomedical Sciences, University of Sassari; [b] Rehabilitation Unit, Campus Bio-Medico University Hospital Foundation; [c] Department of Engineering, Campus Bio-Medico University of Rome; [d] "e-Campus" Online University; [e] IRCCS Don Carlo Gnocchi Foundation*

**ID#2** **Upper limb muscle synergies in people with Poland syndrome**

**V. Illiano [a], C. Pierella [b], V. Anfossi [c,d], F. Cotellessa [d], L. D'Angelo [d,e], D. Del Chiaro [d,e], C. Martinoli [h,i], M. Moro [a,b,c], M. Pedemonte [a], S. Strano [d,e], I. Baldelli [f,g], M. Casadio [a,b], L. Mori [d,e]**
*[a] Department of Informatics, Bioengineering, Robotics and Systems Engineering (DIBRIS), University of Genova, Genova, Italy; [b] RAISE Ecosystem, Genoa, Italy; [c] Machine Learning Genoa (MaLGa) Center; [d] IRCCS Ospedale Policlinico San Martino, 16132 Genoa, Italy; [e] Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, University of Genoa, 16132 Genoa, Italy; [f] Department of Surgical Sciences and Integrated Diagnostics (DISC), University of Genoa, Genoa, Italy; [g] Division of Plastic and Reconstructive Surgery, IRCCS Ospedale Policlinico San Martino, Genoa, Italy; [h] Department of Radiology-III, IRCCS AOU San Martino-IST; [i] University of Genoa, Genoa, Italy*

**ID#4** **Application of dynamic time warping to Fragile X syndrome's gait patterns: a supervised approach**

**F. Beghetti [a], D. Varagnolo [a,b], F. Spolaor [c], A. Guiotto [a], E. DiGiorgio [c], V. Liani [c], R. Polli [c], A. Murgia [c], Z. Sawacha [a]**
*[a] Department of Information Engineering, University of Padua, Padua, Italy; [b] Department of Engineering Cybernetics, Norwegian University of Science and Technology, Trondheim, Norway; [c] Department of Women's and Children's Health, University of Padua, Padua, Italy*

**ID#5** **An automatic anthropometric model generation tool for scalable human whole-body musculoskeletal modeling**

**L. Fiori [a,b], C. Latella [a,b], A. Tatarelli [a,b], D. Pucci [a,b,c]**
*[a] AMI, Istituto Italiano di Tecnologia, Genoa, Italy; [b] RAISE Ecosystem, Genoa, Italy; [c] School of Computer Science, University of Manchester, UK*

**ID#8** **Observational pilot study of the correlation between indices deriving from the acceleration of trunk and emg parameters of the muscles in the lower limb**

**D. Massarelli [a], A. Marsocci [a], F. Curti [a], F. Magnifica [a]**
*[a] La Sapienza, Rome, Italy*

**ID#10** **Within-session variability of different gait quality indices in neurological disorders**

**A.S. Orejel Bustos [a,b], M. Tramontano [c], P. Brasiliano [b], V. Belluscio [a,b], S. Vasta [d], G. Marangon [e], E. Bergamini [b,f], G. Vannozzi [a,b]**
*[a] IRCCS Santa Lucia Foundation, Rome, Italy; [b] Department of Movement, Human and Health Sciences, University of Rome "Foro Italico", Rome, Italy; [c] Department of Biomedical and Neuromotor Sciences - DIBINEM, Alma Mater Università di Bologna, Bologna, Italy; [d] Department of Cognitive, Psychological, Pedagogical Sciences and Cultural Studies - COSPECS, University of Messina, Messina, Italy; [e] Department of Neuroscience, Imaging and Clinical Sciences, University of Chieti-Pescara, Chieti, Italy; [f] Department of Management, Information and Production Engineering, University of Bergamo, Dalmine, Bergamo, Italy*

**ID#14** **Assessment of Quantitative Metrics for Spontaneous Movement Analysis Using a Single RGB-D Camera: A Case Study of Twins with Divergent Health Profiles**

**D. Balta [a], I.G. Porco [b], H. Hoang [c], M.M. Schladen [c], A. Cereatti [a], P.S. Lum [c], U. Della Croce [b,c]**
*[a] Politecnico di Torino, Torino, Italy; [b] University of Sassari, Sassari, Italy; [c] The Catholic University of America, Washington DC, United States of America*

**ID#16** **A method for mechanical crosstalk rejection and running event detection on a 9-force plates instrumented track**

**R. Di Marco [a], G. Zullo [b], S.G. Breban [b], A.G. Cutti [c], N. Petrone [b]**
*[a] Department of Engineering for Innovation Medicine, University of Verona, Verona, Italy; [b] Department of Industrial Engineering, University of Padova, Padova, Italy; [c] Centro Protesi, INAIL, Vigorso, Italy*

**ID#17** **Reliability of a 3D Model-Based Marker-less Approach for Clinical Gait Analysis with a Single RGB-Depth Camera**

**D. Balta [a], J. Riad [b], U. Della Croce [c], A. Cereatti [a]**
*[a] Politecnico di Torino, Torino, Italy; [b] University of Gothenburg, Gothenburg, Sweden; [c] University of Sassari, Sassari, Italy*

**ID#18** **Gait initiation, a phase transition containing rehabilitative information**

**M. Petrarca [a], M. Favetta [a], A. Speroni [a], J. Iovalè [a], P. Tavassi [a], G. Della Bella [a], D. Lettori [a]**
*[a] Movement Analysis and Robotics laboratory (MARlab), Bambino Gesù Children's Hospital, IRCCS, Rome Italy*

**ID#21** **IMU-based ambulatory pre-surgical assessment of Spinal Decompressive Surgery**

**R. Stagni [a], A. Pasotti [a,b], L.E. Noli [b], E. Serchi [b], C. Griffoni [c], M.C. Bisi [a], L. Cristofolini [a], G. Barbanti Brodano [c], A. Conti [b,d]**
*[a] DEI, University of Bologna, Italy; [b] Department of Neurosurgery, IRCCS Istituto delle Scienze Neurologiche di Bologna, Italy; [c] Department of Spine Surgery, IRCCS Istituto Ortopedico Rizzoli, Italy; [d] DIBINEM, University of Bologna, Italy*

**ID#22** **Anterior cruciate ligament injury prevention and recovery: towards an ecological assessment of knee stability**

A. Baldazzi [a], R. Borzuola [a], L. Rum [b], S. Della Rocca [a], J. Jacques [c], H. Pillet [d], A. Macaluso [a], F. Margheritini [a], E. Bergamini [e]

*[a] Università degli Studi di Roma "Foro Italico", Rome, Italy; [b] Università degli Studi di Sassari, Sassari, Italy; [c] National Institute of Applied Sciences of Toulouse, Toulouse, France; [d] Arts et Métiers ParisTech, Paris, France; [e] Università di Bergamo, Bergamo, Italy*

**ID#31** **Predicting ACL and PCL overloading for injury prevention through a 6DOF knee EMG-driven model**

G. Rigoni [a], M. Dalle Vacche [a], F. Spolaor [a], D. Pavan [a], Z. Sawacha [a]

*[a] Università degli Studi di Padova*

**ID#32** **Reliability assessment of a 3D markerless body pose estimation in children with and without applying a multi camera triangulation algorithm**

G. Rigoni [a], A. Guiotto [a], F. Spolaor [a], Z. Sawacha [a]

*[a] Università degli Studi di Padova*

**ID#36** **Markerless estimation of sit-to-stand kinematics through an optimized DeepLabCut model**

D. Milone [a], L. D'Agati [a], F. Longo [a], G. Merlino [a], G. Risitano [a], C. De Marchis [a]

*[a] Department of Engineering (DI), University of Messina, Contrada di Dio, Messina, 98166, Italy*

**ID#37** **The mnesys-cmsyn study: exploring cortico-muscular coherence during hand and upper limb movements**

G. Lomele [a], T. Lencioni [a], A. Comanducci, M. Cabinio [a], A. Marzegan [a], J. Jonsdottir [a], M. Rabuffetti [a], L. Fornia [a,b], M. Ferrarin [a]

*[a] IRCCS Fondazione Don Carlo Gnocchi, Milan, Italy; [b] Università degli studi di Milano – La Statale, Milan, Italy*

**ID#40** **A 'Fingerprint' of fine motor control maturation: motor development descriptors and reference development bands in primary school children**

M.C. Bisi [a], R. Stagni [a]

*[a] Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione "Guglielmo Marconi" – DEI, Università di Bologna, Bologna, Italy*

**ID#41** **Anticipatory postural adjustments for reaching and lifting an object from the floor**

P. Di Florio [a], M. Sicbaldi [b], L. Palmerini [b], A. Silvani [a], L. Chiari [b]

*[a] University of Bologna, Department of Biomedical and Neuromotor Sciences; [b] University of Bologna, Department of Electrical, Electronic and Information Engineering*

**ID#42** **COM velocity estimation with wearable sensors during reaching and lifting an object from the floor**

P. Di Florio [a], M. Sicbaldi [b], L. Palmerini [b], A. Silvani [a], L. Chiari [b]

*[a] University of Bologna, Department of Biomedical and Neuromotor Sciences; [b] University of Bologna, Department of Electrical, Electronic and Information Engineering*

**ID#44** **Reliability assessment of IMU-driven inverse kinematics in Opensim: a proof of concept**

**M. Dalle Vacche [a], G. Rigoni [a], A. Lazzarini [a], A. Guiotto [a], F. Spolaor [a], Z. Sawacha [a]**
*[a] University of Padova, Padova, Italy*

**ID#46** **Optimized Gait Classification in Hereditary Cerebellar Ataxia via AI-Driven Data Balancing Methods**

**D. Trabassi [a], S.F. Castiglia [a,b], F. Bini [c], F. Marinozzi [c], A. Ajoudani [d], M. Lorenzini [d], I. Gennarelli [d], A. Ranavolo [e], C. Tassorelli [b,f], R. De Icco [b,f], C. Casali [a], M. Serrao [a]**
*[a] Department of Medical and Surgical Sciences and Biotechnologies, "Sapienza" University of Rome, Latina, Italy; [b] Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; [c] Department of Mechanical and Aerospace Engineering, Sapienza University of Rome, Rome, Italy; [d] HRI2 Laboratory, Istituto Italiano di Tecnologia, Genoa, Italy; [e] Department of Occupational and Environmental Medicine, Epidemiology and Hygiene, INAIL, Rome, Italy; [f] Headache Science & Neurorehabilitation Unit, IRCCS Mondino Foundation, Pavia, Italy*

**ID#47** **Characterization of upper-limb biomechanics during center-out reaching task: preliminary results of motor learning during repeated execution in a single training session**

**M. Lubrano [a], M.C. Bisi [a], S. Fantozzi [a], R. Stagni [a]**
*[a] University of Bologna, Bologna, Italy*

**ID#53** **Comparison of inertial-based filters for orientation estimation in indoor and outdoor running**

**A. Machetti [a], R. Rossanigo [b,c], M. Caruso [a], G. Martinez [b], L. Ventura [b], A. Manca [b], F. Deriu [b,d], A. Cereatti [a]**
*[a] Department of Electronics and Telecommunications, Politecnico di Torino, Turin, Italy; [b] Department of Biomedical Sciences, University of Sassari, Italy; [c] NeuroRehab Research Center, Lausanne University Hospital (CHUV), Lausanne, Switzerland; [d] Unit of Endocrinology, Nutrition, and Metabolic Disorders, AOUSS, Sassari, Italy*

**ID#62** **Capturing gait signature: a biomechanically driven marker-less approach based on multiple RGB cameras**

**B. Sabbadini [a], D. Balta [a], P. Tasca [a], A. Cereatti [a]**
*[a] Polytechnic University of Turin, Turin, Italy*

**ID#69** **Real-world gait detection with a head-worn inertial unit and features-based machine learning**

**P. Tasca [a], F. Salis [b], A. Cereatti [a]**
*[a] Politecnico di Torino, Turin, Italy; [b] University of Sassari, Sassari, Italy*

**ID#72** **MOVEWISE (mobility observation via wearable integrated sensor evaluation): a multicentric, prospective, observational, and longitudinal study**

**M. Caruso[a], D. Vecchio[b], V. Agostini[a], M. Boldreghini[c], A. Canale[c], M. Canonico[d], M. Clerico[e], L. Cosenza[f], G. Olmo[g], S. Polidoro[h], L. Priano[i,j], S. Rolla[e], A. Dal Molin[h], A. Cereatti[a]**

*[a] Department of Electronics and Telecommunications, Politecnico di Torino, Turin, Italy; [b] Neurology Unit, Department of Translational Medicine, University of Piemonte Orientale, Novara, Italy; [c] Department of Surgical Sciences, University of Turin, Turin, Italy; [d] Department of Sciences and Technological Innovation, University of Piemonte Orientale, Alessandria, Italy; [e] Department of Clinical and Biological Sciences, University of Turin, Turin, Italy; [f] Physical and Rehabilitation Medicine, "Ospedale Maggiore della Carità" University Hospital, Novara, Italy; [g] Department of Control and Computer Engineering, Politecnico di Torino, Turin, Italy; [h] Department of Translational Medicine, University of Piemonte Orientale, Novara, Italy; [i] Department of Neurosciences, University of Turin, Turin; [j] Istituto Auxologico Italiano, IRCCS, Department of Neurology and Neurorehabilitation, Oggebbio (Piancavallo), Verbania, Italy*

**ID#73** **Development and validation of an algorithm based on ankles-IMU setup for the extraction of gait parameters**

**G. Prisco[a], F. Mercaldo[a], A. Santone[a], F. Esposito[b], F. Amato[c], M. Cesarelli[d], L. Donisi[b]**

*[a] University of Molise, Campobasso, Italy; [b] University of Campania Luigi Vanvitelli, Naples, Italy; [c] University of Naples Federico II, Naples, Italy; [d] University of Sannio, Benevento, Italy*

**ID#74** **Quantitative Assessment of Early Stage Passive Rehabilitation through Kinematic Indices**

**G. Iaselli[a], G. Pagano[b], A. Coccia[a], F. Colelli Riano[a], A. Biancardi[a], F. Amitrano[a], G. D'Addio[a]**

*[a] Istituti Clinici Scientifici Maugeri IRCCS, Bioengineering Unit of Telese Terme Institute, Italy; [b] Istituti Clinici Scientifici Maugeri IRCCS, Bioengineering Unit of Bari Institute, Italy*

**ID#78** **What is the minimum stiffness of dynamic AFOs for people with foot drop? A gait-analysis based dynamic study**

**G. Rogati[a], F. Beghetti[b], Z. Sawacha[b], A. Leardini[a], P. Caravaggi[a]**

*[a] IRCCS Istituto Ortopedico Rizzoli, Bologna (Italia); [b] BioMov Laboratory, dep. of Information Engineering, Università di Padova, Padova (Italia)*

**ID#84** **The RAISE-FitFES Project: usability and acceptability of a Functional Electro-stimulator controlled by electromyographic signal for post-stroke in-patients**

**G. Bailo[a], A. Di Meo[a], J. Jonsdottir[a], A. Romano[a], P. Balbi[a], R. Bertoni[a], P. Di Bello[b], T. Lencioni[a], F. Lucchetti[a], A. Marzegan[a], C. Trompetto[c], M. Semprini[b], M. Ferrarin[a]**

*[a] IRCCS Don Carlo Gnocchi Foundation, Milan, Italy; [b] Italian Institute, Genoa, Italy; [c] IRCCS San Martino Policlinico Hospital, Genoa, Italy*

**ID#87** **A Deep Learning approach based on a Convolutional Neural Networks architecture towards Abnormal Human Activity Recognition**

**L. Palazzo [a,*], V. Suglia [b,*], G. Pagano [a], A. Passantino [c], G. D'Addio [a,d], V. Bevilacqua [b,e]**

*[a] Bioengineering Unit of Bari, Istituti Clinici Scientifici Maugeri IRCCS, Bari, Italy; [b] Department of Electrical and Information Engineering (DEI), Polytechnic University of Bari, Bari, Italy; [c] Cardiac Rehabilitation Unit of Bari, Istituti Clinici Scientifici Maugeri IRCCS, Bari, Italy; [d] Bioengineering Unit of Telese Terme, Istituti Clinici Scientifici Maugeri IRCCS, Telese Terme, Italy; [e] Apulian Bioengineering S.R.L., Modugno, Italy; * These authors equally contributed to this work.*

**ID#89** **Fall prevention and self-care in elderly: the FREECARE case study**

**M.Ramaglia[a], M.Ramaglia[a], D.Giansanti[a], D.Palma[a], F.Amitrano[b], A.Coccia[b], G.D'Addio[b]**

*[a] Adiramef Group SpA; [b] Istituti Clinici Scientifici Maugeri IRCCS, Bioengineering Unit of Telese Terme, Italy*

**ID#92** **A motion capture protocol for the in-vivo assessment of running and long jumping biomechanics in transfemoral and transtibial running elite para-athletes**

**R. Di Marco [a], S.G. Breban [b], G. Zullo [b], G.L. Migliore [c], F. Gariboldi [b], M. Scapinello [b], G. Marcolin [d], A.G. Cutti [c], N. Petrone [b]**

*[a] Department of Engineering for Innovation Medicine, University of Verona, Italy; [b] Department of Industrial Engineering, University of Padova, Italy; [c] Centro Protesi, INAIL, Vigorso, Italy; [d] Department of Biomedical Sciences, University of Padova, Italy*

**ID#95** **Muscle activation during Action Observation: experimental insights**

**F.Verdini[a], A.Mengarelli[a], A.Tigrini[a], R.Mobarak[a], M.Scattolini[a], E.Pasquinelli[b], J.Brambatti[b], P.Casoli[b], S.Fioretti[a], L.Burattini[a], M.G.Ceravolo[b], M.G.Benedetti[c], M.Capecci[b]**

*[a] Dipartimento di Ingegneria dell'Informazione, Università Politecnica delle Marche, Ancona, Italia; [b] Dipartimento di Medicina Sperimentale e clinica, Università Politecnica delle Marche, Ancona, Italia; [c] Dipartimento di Scienze Biomediche e Neuromotorie, Università degli Studi di Bologna, Bologna, Italia*

**ID#96** **Continuous estimation of vertical ground reaction force during unconstrained walking by lower limb EMG recordings**

**A.Mengarelli[a], A.Tigrini[a], F.Verdini[a], M.Scattolini[a], R.Mobarak[a], L.Burattini[a], S.Fioretti[a]**

*[a] Università Politecnica delle Marche, Ancona, Italy*

**ID#102** **Enhancing Injury Prevention and Performance Monitoring in Athletes through EMG Analysis**

**J. Simeone [a], R. Zinni [a], F. Boldi [b], R. Oliveto [c]**

[a] Datasound srl, Pesche (IS), Italy; [b] XEOS., Brescia, Italy; [c] University of Molise, Pesche (IS), Italy and Datasound srl, Pesche (IS), Italy

**ID#105** **Softball players with shoulder injuries exhibit upper-body compensatory strategies compared to healthy controls: a wearable inertial sensors study**

**R. Zinno [a], S. Di Paolo [b], M. Hoyaux [c], A. Minardi [a], L. Bragonzoni [a]**

*[a] Department for Life Quality Studies, University of Bologna, Rimini, Italy; [b] Orthopaedic and Traumatologic Clinic, IRCCS, Rizzoli Orthopaedic Institute, Bologna, Italy; [c] EPF Cachan School of Engineering, Cachan, France*

**ID#112** **Enhancing Motion Analysis in Medical Diagnostics through Explainable Artificial Intelligence**

**R. Zinni [a,b], N. Balletti [c,d] J. Simeone [a], R. Oliveto [a,d]**

*[a] Datasound srl, Pesche (IS), Italy; [b] WordPower, San Salvo (CH), Italy; [c] Center for Biotechnology, Institute of Biomedical Sciences of the Ministry of Defense, Rome, Italy; [d] University of Molise, Pesche (IS), Italy*

16.00 Coffee break

**17.00** **PRESENTAZIONI ORALI 3**
**Artificial Intelligence and Machine Learning in Clinical Assessment**
*Chairs: Fabiola Spolaor, Andrea Mannini*

**Predicting 60-day Recovery Outcomes After ACL Surgery Using Machine Learning**

**P. Liuzzi [a], E. Nesi [a], S. Campagnini [a], F. Mari [b], I. Dimauro [b], N. Carta [c], J. Rocchi [c], E. Bergamini [d], A. Mannini [a], P.P. Mariani [c]**

*[a] IRCCS Fondazione Don Carlo Gnocchi, Firenze, Italy; [b] University of Roma Foro Italico, Department of Movement, Human and Health Sciences, Roma, Italy; [c] Villa Stuart, Roma, Italy; [d] University of Bergamo, Department of Management, Information and Production Engineering, Bergamo, Italy*

**Deep learning algorithms for the recognition of human movements in work activities**

**A. De Rosa [a], L. Palazzo [a], T. Falcone [b], P. Lenzuni [c], G. D'Addio [a], V. Molinaro [d], A. Ranavolo [d], S. Del Ferraro [d]**

*[a] Istituti Clinici Scientifici Maugeri IRCCS, Bioengineering Unit of Telese Terme Institute, Italy; [b] Consiglio Nazionale delle Ricerche (CNR), Istituto per i Polimeri, Compositi e Biomateriali (iPCB), Italy; [c] INAIL-Direzione Regionale Toscana-Unità Operativa Territoriale di Firenze; [d] INAIL-Dipartimento di Medicina, Epidemiologia, Igiene del Lavoro e Ambientale-Laboratorio di Ergonomia e Fisiologia*

**Machine learning applied to gait analysis data in cerebral palsy and stroke: A systematic review**

**F. Samadi Kohnehshahri [a,b], A. Merlo [b], D. Mazzoli [b], M.C. Bò [b], R. Stagni [a]**

*[a] Department of Electronic and Information Engineering, University of Bologna, Italy; [b] Gait and Motion Analysis Laboratory OPA Sol et Salus, Torre Pedrera, Rimini, Italy*

**Locomotion characterization of stroke patients through machine learning and feature selection techniques**

**P. Brasiliano [a], V. Belluscio [a,b], A.S. Oreje Bustos [a,b], M. Tramontano [c], G. Vannozzi [a,b], E. Bergamini [d]**

*[a] Department of Movement, Human and Health Sciences, University of Rome "Foro Italico", Rome, Italy; [b] IRCCS Santa Lucia Foundation, Rome, Italy; [c] Department of Biomedical and Neuromotor Sciences - DIBINEM, Alma Mater Università di Bologna, Bologna, Italy; [d] Department of Management, Information and Production Engineering, University of Bergamo, Bergamo, Italy*

### AI-Enhanced Wearables: Transforming Parkinson's and Atypical Parkinsonism Diagnosis

**I. D'Ascanio [a], G. Lopane [b], I. Cani [b,c], L. Baldelli [b,c],G. Giannini [b,c], L. Chiari [a,d], P. Palmerini [a,d]**

*[a] Department of Electrical, Electronic and Information Engineering, Alma Mater Studiorum – University of Bologna, Bologna, Italy; [b] IRCSS Istituto delle Scienze Neurologiche di Bologna, Bologna, Italy; [c] Departement of Biomedical and NeuroMotor Sciences (DIBINEM), Alma Mater Studiorum – University of Bologna, Bologna, Italy; [d] Health Sciences and Technologies, Interdepartmental Center for Industrial Research (CIRI-SDV), Alma Mater Studiorum - University of Bologna, Bologna, Italy*

### Muscle pre-activation prior to landing in athletes with anterior cruciate ligament reconstruction: detection of EMG onset using artificial intelligence

**F. Russo [a], M. Ghislieri [a], A. Baldazzi [b], L. Rum [c], E. Bergamini [d], V. Agostini [a]**

*[a] Polytechnic University of Turin, Turin, Italy; [b] University of Rome "Foro Italico", Roma, Italy; [c] University of Sassari, Sassari, Italy; [d] University of Bergamo, Bergamo, Italy*

### Best task and best gait measure to identify de novo and moderate Parkinson's disease: a lesson learned from a machine learning point of view

**V.A. Arcobelli [a], P. Carlson-Kuhta [b], D. Enge l [b], P. Burgos [b], V.V. Shah [b,c], S. Mellone [a], L. Chiari [a], F.B. Horak [b,c], M Mancini [b]**

*[a] Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi", University of Bologna, Bologna, Italy; [b] Department of Neurology, School of Medicine, Oregon Health and Science University, Portland, OR, USA; [c] APDM Wearable Technologies, a Clario company, Portland, OR, USA*

18.30 Conclusione della giornata

08.00 Registrazione Congresso

08.45 **Saluti e apertura del Presidente del Congresso**

**09.00 PRESENTAZIONI ORALI 4**
**Cutting-Edge Technologies in Rehabilitation**
*Chairs: Ilaria Giuseppina Porco, Andrea Caronni*

### Neuromotor recovery of walking in post-stroke individuals using TWIN-Acta-based robotic assisted gait training

**T. Lencioni [a], P. Arcuri [a], G. Bailo [a], T. Bowman [a], I. Ceroni [b], A. Comanducci [a], P. Di Bello [b], J. Jonsdottir [a], F. Lucchetti [a], S. Scarpetta [b], S. Squartecchia [a], A. Torchio [a], M. Semprini [b], M. Ferrarin [a]**
*[a] IRCCS Fondazione Don Carlo Gnocchi, Milan, Italy; [b] Istituto Italiano di Tecnologia, Genova, Italy*

### Gait Analysis in Patients Undergoing Rehabilitation after Soft Tissue Sarcoma Surgery. Preliminary results

**M. Germanotta [a], F. Falchini [a], S. Valeri [b], B. Vincenzi [c], C. Pagnoni [b], M. Angelucci [b], M. Fiore [d], A. Gronchi [d], R. Passa [b], A. Valeri [e], M.C. Mauro [a], A. Fasano [a], A. Pavan [a], S. Lattanzi [a], L. Cortellini [a], I.G. Aprile [a]**
*[a] IRCCS Fondazione Don Carlo Gnocchi Onlus, Florence, Italy; [b] Fondazione Policlinico Universitario Campus Bio-Medico, Operative Research Unit of Soft-Tissue Sarcomas Surgery Department, Rome, Italy; [c] Fondazione Policlinico Universitario Campus Bio-Medico-, Operative Research Unit of Medical Oncology, Rome, Italy; [d] Fondazione IRCCS Istituto Nazionale dei Tumori, Department of Surgery, Milan, Italy; [e] University of Campus Bio-Medico, Operative Research Unit of Plastic- Reconstructive and Aesthetic Surgery, Rome, Italy*

### A mixed reality system for the evaluation of the effects of exoskeletons on cognitive load during manual handling task

**E. Scalona [a], A. Piol [b], M.L. Cavallo [c], M. Mosso [b], F.B.G. Bushara [b], G. Valli [c], G. Rossetto [b], N. Pintori [c], L. Falciati [c], D. Brignani [c], F. Negro [c], N. F. Lopomo [d]**
*[a] Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Italy; [b] Department of Information Engineering, University of Brescia, Italy; [c] Department of Clinical and Experimental Sciences, University of Brescia, Italy; [d] Department of Design, Politecnico di Milano, Italy*

### Rehabilitation with kinematic biofeedback improves shoulder function in patients surgically treated for rotator cuff tear: indications from a randomized controlled trial

**I. Parel [a], A. Padolino [a], V. Candoli [a], M.V. Filippi [a], G. Merolla [a], P. Paladini [a], S. Sanniti [a], A.G. Cutti [b]**
*[a] Laboratory of Biomechanics, Cervesi Hospital, Cattolica, Italy; [b] Motion Analysis Laboratory, INAIL Prostheses Center, Vigorso di Budrio, Italy*

### Identification of compensatory movements by a single low-cost inertial sensor during rehabilitation exercises

**F. Caramia [a], E. Bellucci b, E. D'Angelantonio [c], L. Lucangeli [c], V. Camomilla [a]**
*[a] University of Rome "Foro Italico", Rome, Italy; [b] University of Tuscia, Viterbo, Italy; [c] Technoscience, Latina, Italy*

### Efficacy of telerehabilitation training in stroke patients: evaluation of gait parameters

**C. Iacovelli [a], S. Giovannini [b], L. Castelli [b], F. Bove [a], I. Scala [a], A. Tomaino [a], G. Salvatori [a], A. Bentivoglio [a], P. Calabresi [a], P. Caliandro [a]**
*[a] Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy; [b] Università Cattolica del Sacro Cuore, Rome, Italy*

**10.15** **LEZIONE MAGISTRALE 4**
*Chair: Andrea Pilotto*

### What can exercise offer to help gait and balance problems in Parkinson's Disease?

**Prof.ssa Alice Nieuwboer**
*Full Professor in the Department of Rehabilitation Sciences at KU Leuven, Belgium*

Discussione

11.15 Coffee break

**11.45** **PRESENTAZIONI ORALI 5**
**Exploring Neuromuscular Control and Balance**
*Chairs: Marica Giardini, Dante Trabassi*

### Compensation strategies during perturbed gait

**M. Petrarca [a], M. Favetta [a], S. Carniel [a], S. Gazzellini [a], A. Speroni [a], G. Della Bella [a], D. Lettori [a], S. Summa [a], A. Berthoz[b]**
*[a] Movement Analysis and Robotics Laboratory (MARlab), Bambino Gesù Children's Hospital, IRCCS, Rome, Italy; [b] Laboratoire de Physiologie de la Perception et de l'Action, Collège de France, 11, rue Marcelin Berthelot, 75005 Paris, France*

### IMU-Based balance assessment as an alternative to gold standard COP-based posturography: are we there yet?

**M.C. Bisi [a], R. Stagni [a]**
*[a] Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione "Guglielmo Marconi" – DEI, Università di Bologna, Bologna, Italy*

### Approximate bayesian computation and intermittent control model of balance maintenance: an attempt to "open the box" of neuromuscular control strategy in diabetic subjects with and without neuropathy

**A. Tigrini [a], A. Mengarelli [a], F. Verdini [a], R. Mobarak [a], M. Scattolini [a], T. Nomura [b], R.A. Rabini [c], S. Fioretti [a], L. Burattini[a]**

*[a] Department of Information Engineering, Università Politecnica delle Marche, Ancona, Italy; [b] Graduate School of Informatics, Kyoto University, Japan; [c] Department of Diabetology, Mazzoni Hospital Ascoli Piceno, Italy*

### Responsiveness to rehabilitation of local dynamic stability of the trunk in subjects with primary degenerative cerebellar ataxia

**S.F. Castiglia [a], D. Trabassi [a], C. Conte [a], T. Varrecchia [c], G. Chini [c], A. Ranavolo [c], C. Casali [a], M. Serrao [a,d]**

*[a] Department of Medico-Surgical Sciences and Biotechnologies, "Sapienza" University of Rome-Polo Pontino, Latina, Italy; [b] Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; [c] Department of Occupational and Environmental Medicine, Epidemiology and Hygiene, INAIL, Monte Porzio Catone, Italy; [d] Movement Analysis Laboratory, Policlinico Italia, Roma, Italy*

### Effects of fatigability induced by prolonged walking in people with Multiple Sclerosis: preliminary results on static and dynamic balance

**I. Carpinella [a], R. Bertoni [a], R. Cardini [b], A. Tacchino [c], E. Grange [c], G. Brichetto [c, d], C. Solaro [e], M. Rovaris [a], M. Ferrarin [a], D. Cattaneo [a, b], E. Gervasoni [a]**

*[a] IRCCS Don Carlo Gnocchi Foundation, Milan, Italy; [b] University of Milan, Milan, Italy; [c] Italian Multiple Sclerosis Foundation (FISM), Genoa, Italy; [d] Italian Multiple Sclerosis Society (AISM), Genoa, Italy; [e] Galliera Hospital, Genoa, Italy*

### Investigating Muscle Coordination during Dynamic Functional Reach Assessment

**I. Ceriello [a], R. Borzuola [a], L. Rum [b], V. Camomilla [a], A. Macaluso [a]**

*[a] University of Rome "Foro Italico", Rome, Italy; [b] University of Sassari, Sassari, Italy*

### Do people with persistent postural-perceptual dizziness really sway? An instrumental sensor-based study

**D. Piatti [a], L. Casagrande Conti [a], G. Paolocci [a, b], E. Bergamini [c], L. Manzari [d], G. Attanasio [e], I. Indovina [a, b], M. Tramontano [f,g]**

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13.15 Light lunch

## 14.15 TAVOLA ROTONDA E DIBATTITO CON OSPITI

*Chair: Francesco Di Nardo*

**Dott.ssa Isabella Campanini**
**Prof. Stefano Mazzoleni**
**Dott. Giancarlo Rovere**
**Prof. Mariano Serrao**

## 15.15 Poster Clinici 2

*Chairs Panic Session: Amaranta Soledad Orejel Bustos, Pietro Picerno*

### ID#3 Virtual Reality and Mirror Therapy during Upper Limb Movements. An EEG Study

**M. Capecci [a], N. Baldini [a], F. Annunzi [a], A. Antoniello [a], M.G. Ceravolo [a]**
*[a] Dipartimento di Medicina Sperimentale e Clinica, Università Politecnica delle Marche, Ancona, Italy.*

### ID#6 Assessing gait impairments in neurological populations: a preliminary study of an ecological protocol

**A. Rossi [a], A.S. Orejel Bustos [a,b], L. Rum [c], A. Manzo [b], M.G. Buzzi [b], G. Vannozzi [a,b], V. Belluscio [a,b]**
*[a] Department of Movement, Human and Health Sciences, University of Rome "Foro Italico", Rome, Italy; [b] IRCCS Santa Lucia Foundation, Rome, Italy; [c] University of Sassari, Sassari, Italy*

### ID#7 Assessment of erector spinal muscles activation in pre and post training with surface electromyography in an equestrian athlete with recurring non-specific low back pain

**F. Curti [a], A. Marsocci [a], D. Massarelli [a], F. Magnifica [a]**
*[a] Sapienza University, Rome, Italy*

### ID#12 Do feet position and visual target distance affect postural stability and body weight distribution in healthy subjects?

**P. De Blasiis [a], A. Fullin [b], C.I. De Girolamo [b], P. Caravaggi [c], P. Arpaia [d], A. De Luca [e]**
*[a] School of Engineering, University of Basilicata, 85100 Potenza, Italy; [b] Department of Advanced Biomedical Sciences, University of Naples "Federico II", 80131 Naples, Italy; [c] Movement Analysis Laboratory, IRCCS Istituto Ortopedico Rizzoli, 40136, Bologna, Italy; [d] Department of Electrical Engineering and Information Technologies, University of Naples Federico II, 80138 Naples, Italy; [e] Department of Mental and Physical Health and Preventive Medicine, Section of Human Anatomy, University of Campania "Luigi Vanvitelli", Naples, Italy*

### ID#13 Effects of a wearable device (Q-walk) for gait retraining in Parkinson's disease

**F. Spolaor [a], G. Rigoni [b], A. Guiotto [b], F. Cibin [c], Rizzetto [d], Z. Sawacha [b], D. Volpe [d]**
*[a] Department of Women's and Children's Health, University of Padova, Padova; [b] Department of Information Engineering, University of Padova, Padova; [c] BBSoF srl. Via della Croce Rossa 112, 35129, Padova; [d] Fresco network of excellence, Villa Margherita Parkinson Centre, Vicenza*

**ID#19** **Motor control hypothesis embedded in the controller of robotic knee orthosis**

**M. Petrarca [a], M. Bottoni [a], M. Favetta [a], A. Speroni [a], P. Tavassi [a], J. Lovalè [a], G. Della Bella [a]**
*[a] Movement Analysis and Robotics laboratory (MARlab), Bambino Gesù Children's Hospital, IRCCS, Rome Italy*

**ID#24** **Age-related differences in mechanical fatigue and spatial EMG distribution of vastus lateralis muscle during dynamic contractions in old trained, old untrained, and middle-aged people**

**M. Carbonaro [a], I. Gennarelli [a], C. Brusco Müller [b], I. Baltasar-Fernandez [c], J. Alcazar [c], F. Lauretani [d], M. Franchi [b], S. Porcelli [e], A. Botter [a]**
*[a] Laboratory for Engineering of the Neuromuscular System (LISiN), Department of Electronics and Telecommunication, Politecnico di Torino, 10129 Torino, Italy; [b] Department of Biomedical Sciences, University of Padova, Padova, Italy; [c] GENUD Toledo Research Group, Faculty of Sport Sciences, University of Castilla-La Mancha, Toledo, Spain; [d] Geriatric Clinic Unit, Medical Geriatric Rehabilitative Department, University Hospital of Parma, Parma, Italy; [e] Department of Molecular Medicine, University of Pavia, Pavia, Italy*

**ID#25** **The effect of functional electrical stimulation on freezing of gait in people with parkinsons' disease: a pilot study**

**L. Bellotti [a], S. Marcu [b], A. Marzegan [c], I. Bersch [d], A. Castagna [c]**
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**ID#26** **Assessing lower limb coordination during heel strike in Parkinson disease patients**

**R. Minino [a], E. Troisi Lopez [b], A. Romano [a], P. Sorrentino [c], G. Sorrentino [a]**
*[a] University of Naples Parthenope; [b] Institute of Applied Sciences and Intelligent Systems, National Research Council, Pozzuoli, Italy; [c] Institut de Neurosciences des Systèmes, Aix-Marseille Université, Marseille, France*

**ID#28** **Instrumental static balance assessment of patients with Parkinson's disease and Parkinsonism for clinical applications: a systematic review**

**L. Cavazzuti [a], M.C. Bò [a], M.C. Bassi [b], F. Cavallieri [c], F. Valzania [c], G. Di Rauso [c], G. Portaro [c], V. Fioravanti [c], B. Damiano [a], S. Scaltriti [a], A. Merlo [a], I. Campanini [a]**
*[a] LAM - Motion Analysis Laboratory, Neuromotor and Rehabilitation Department, San Sebastiano Hospital, Azienda USL-IRCCS di Reggio Emilia, Correggio (Reggio Emilia), Italy; [b] Medical Library, Azienda USL-IRCCS di Reggio Emilia, Correggio (Reggio Emilia), Italy; [c] Neurology Unit, Neuromotor & Rehabilitation Department, Azienda USL-IRCCS di Reggio Emilia, Reggio Emilia, Italy*

**ID#29** **The role of an explicit strategy in muscle synergy recruitment and structure during adaptation to virtual surgeries**

**D. Borzelli [a,b], P. De Pasquale [c], S. Gurgone [d], M. Mezzetti [e], A. Quercia [a], D.J. Berger [b,f], L.R. Dal Bello [b], A. d'Avella [b,g]**

*[a] Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy; [b] Laboratory of Neuromotor Physiology, IRCCS Fondazione Santa Lucia, Rome, Italy; [c] Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS) Centro Neurolesi Bonino-Pulejo, Messina, Italy; [d] Center for Information and Neural Networks (CiNet), Advanced ICT Research Institute, National Institute of Information and Communications Technology, Suita City, Osaka, Japan; [e] Department Economics and Finance, University of Rome Tor Vergata, Rome, Italy; [f] Department of Systems Medicine, Centre of Space Bio-medicine, University of Rome Tor Vergata, Rome, Italy; [g] Department of Biology, University of Rome Tor Vergata, Rome, Italy*

**ID#38** **Sex differences in motor unit behavior in young, middle-aged and old adults during moderate isometric contractions**

**M. Boccardo [a], M. Carbonaro [a], C. Brusco Müller [b], F. Lauretani [c], S. Porcelli [d], M.V. Franchi [b], A. Botter [a]**

*[a] LISiN, Department of Electronics and Telecommunication, Politecnico di Torino, Torino, Italy; [b] Department of Biomedical Sciences, University of Padova, Padova, Italy; [c] Geriatric Clinic Unit, Medical Geriatric Rehabilitative Department, University Hospital of Parma, Parma, Italy; [d] Department of Molecular Medicine, University of Pavia, Pavia, Italy*

**ID#43** **The effects of hyaluronic acid on kinematic gait parameters in patients with knee osteoarthritis: a systematic literature review**

**C. Costantino [a], S. Ronzoni [a], A. Ingletto [a], R. Sabato [a], S. Palermi [b], A. Frizziero [a,c], A. Demeco [a]**

*[a] Department of Medicine and Surgery, University of Parma, 43126 Parma, Italy; [b] Public Health Department, University of Naples Federico II, 80131 Naples, Italy; [c] ASST "Gaetano Pini" CTO; 20122 Milano, Italy*

**ID#50** **Evaluation of relationship between neuro-muscular fatigue and manual dexterity in physiotherapists: an observational study**

**F. Phan [a], G. Libiani [b], A. Coda [c], F. Sartorio [a,b]**

*[a] Department of Scientific Research Campus LUdeS Lugano (CH), Off-Campus Semmelweis University of Budapest, Hungary; [b] Istituti Clinici Scientifici Maugeri IRCCS, Department of Physical and Rehabilitation Medicine Unit, Institute of Veruno, Italy; [c] Self-employed physiotherapist, Italy*

**ID#51** **iTUG variables as predictors of falls in older people after femur fracture**

**V. Passoni [a], M. Giardini [a], I. Arcolin [a], S. Guglielmetti [a], S. Corna [a], M. Godi [a]**

*[a] Istituti Clinici Scientifici Maugeri IRCCS, Department of Physical and Rehabilitation Medicine Unit, Institute of Veruno, Italy*

**ID#63** **Integrated instrumental evaluation of the upper limb in the rehabilitation process in children with neuromotor disabilities**

**F. Oppia [a], V. Gasparroni [b], D. Conte [c], M. Lustro [a], M. Cozzi [a], A. Martinuzzi [a]**

*[a] Scientific Institute, IRCCS E. Medea, Conegliano, Treviso, Italy; [b] Scientific Institute, IRCCS E. Medea, Pasian di Prato, Udine, Italy; [c] University of Verona, Verona, Italy*

**ID#64** **Obesity effects on young adults' gait pattern after five years from Sleeve Gastrectomy**

**M. Favetta [a], S. Summa [a], O. Adorisio [b], R. Caccamo [b], G. Della Bella [a], F. De Peppo [b], E. Castelli [a], M. Petrarca [a]**

*[a] Movement Analysis and Robotics Laboratory (MARlab), Neurorehabilitation Unit, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy; [b] Pediatric Surgery Unit, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy*

**ID#66** **Gender differences in ankle kinematic during a change of direction in U18 basketball players**

**L. Bragonzoni [a], S. Pinelli [a], S. Di Paolo [b], A. Jodar-Portas [c], F. Vasileva [c], R. Font-Lladó [d], A. Fort-Vanmeerhaeghe [d], R. Zinno [a]**

*[a] Department for Life Quality Studies, University of Bologna, Rimini, 47921, Italy; [b] 2nd Orthopaedic and Traumatologic Clinic, IRCCS, Rizzoli Orthopaedic Institute, Bologna, 40136, Italy; [c] University School of Health and Sport (EUSES), University of Girona, Girona, Spain; [d] Department of Sports Science, Ramon Llull University, Barcelona, Spain*

**ID#67** **Enhancing soccer athletes' performance: a kinematic analysis of agility training**

**L. Bragonzoni [a], S. Pinelli [a], M. Verduschi [a], R. Zinno [a]**

*[a] Department for Life Quality Studies, University of Bologna, Rimini, 47921, Italy*

**ID#68** **TWIN-Acta controlled exoskeleton in gait rehabilitation for persons post-stroke. A pilot and feasibility study**

**J. Jonsdottir [a], T. Bowman [a], A. Torchio [a], T. Lencioni [a], A. Romano [a], A. Di Meo [a], G. Bailo [a], P. Di Bello [b], I. Ceroni [b], S. Maludrotti [b], S. Scarpetta [b], L. De Michieli [b], M. Semprini [b], M. Ferrarin [a]**

*[a]* IRCCS Fondazione Don Carlo Gnocchi, Milan, Italy; *[b] Istituto Italiano di Tecnologia, Genova, Italy*

**ID#77** **The feasibility study of EMG- and kinematics-based assessment and future directions for the Othello project**

**F. Lucchetti [a], G. Bailo [a], I. Carpinella [a], R. Bertoni [a], M. Bianco [a], M. Cabinio [a], R. Cardini [b], L. Fornia [a,c], A. Nuara [d], F. Rossetto [a], A. Viganò [a], M. Ferrarin [a], T. Lencioni [a]**

*[a] IRCCS Fondazione Don Carlo Gnocchi ONLUS, Milan, Italy; [b] Department of Pathophysiology and Transplantation, University of Milan, Milan, Italy; [c] Department of Medical Biotechnology and Translational Medicine, University of Milan, Milan, Italy; [d] Neuroscience Unit, Medicine and Surgery Department, University of Parma, Parma, Italy*

**ID#80** **Assessing upper limb motor impairments in post-stroke patients using optoelectronic and electromyographic systems during the Action Research Arm Test**

**G. Bailo [a], F. Lucchetti [a], R Bertoni [a], M. Cabinio [a], A. Nuara [b], F. Rossetto [a], A. Viganò [a], I. Carpinella [a], T. Lencioni [a], M. Ferrarin [a]**

*[a] IRCCS Don Carlo Gnocchi Foundation, Milan, Italy; [b] Neuroscience Unit, Medicine and Surgery Department, University of Parma, Parma, Italy*

**ID#81** **Gait analysis in the evaluation of cancer-related fatigue. A literature review**

**D. Coraci [a], C. Pavese [b], M.C. Maccarone [a], G. Dazzi [a], M. Mirando [b], G. Rossi [b], P. Contessa [a], A. Nardone [b], S. Masiero [a]**

*[a] Department of Neuroscience, University of Padova, Padua, Italy; [b] Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy*

**ID#85** **Ankle foot orthosis for children with cerebral palsy: what impact on participation?**

**D. Pandarese [a], C. Borghi [a], S. Aime [a], C. Schito [a], S. Faccioli [a], S. Sassi [a]**
*[a] Children Rehabilitation Unit of Santa Maria Nuova Hospital, Azienda USL-IRCCS di Reggio Emilia, Reggio Emilia, Italy*

**ID#88** **Kinematic data after Latarjet procedure with or without cutting the pectoralis minor muscle in young patients: observational study at 6 month follow-up**

**E. Giannotti [a], I. Parel [b], A. Padolino [c], S. D'Andreamatteo [a], G. Merolla [c], P. Paladini [c]**
*[a] Functional Recovery and Rehabilitation Unit, AUSL della Romagna, Rimini, Italy; [b] Laboratory of Biomechanics "M. Simoncelli", Cervesi Hospital, Cattolica, Italy; [c] Unit of Shoulder and Elbow Surgery, Cervesi Hospital, Cattolica, Italy; [c] Unit of Shoulder and Elbow Surgery, Cervesi Hospital, Cattolica, Italy*

**ID#91** **Analysis of head-trunk movements during gait in healthy and multiple sclerosis subjects: a systematic review**

**J. Pollet [a], A. Di Meo [a], F.G. Mestanza Mattos [b], D. Cattaneo [a,b], A. Torchio [a], R. Buraschi [a], E. Gervasoni [a]**
*[a] IRCCS Fondazione Don Carlo Gnocchi, Milan, Italy; [b] Università degli Studi di Milano, Milan, Italy*

**ID#93** **Gait, posture, and upper limb bradykinesia responsiveness to subthalamic deep brain stimulation and levodopa in patients with Parkinson's disease using digital technology**

**I. D'Ascanio [a], I. Cani [b,c], L. Baldelli [b,c], G. Lopane [b], S. Ranciati [d], P. Mantovani [b], A. Conti [b], P. Cortelli [b,c], G. Calandra-Bonaura [b,c], L. Chiari [a,e], G. Giannini [b,c], P. Palmerini [a,e]**
*[a] Department of Electrical, Electronic and Information Engineering, Alma Mater Studiorum – University of Bologna, Bologna, Italy; [b] IRCSS Istituto delle Scienze Neurologiche di Bologna, Bologna, Italy; [c] Departement of Biomedical and NeuroMotor Sciences (DIBINEM), Alma Mater Studiorum – University of Bologna, Bologna, Italy; [d] Department of Statistical Sciences, University of Bologna, Bologna, Italy; [e] Health Sciences and Technologies, Interdepartmental Center for Industrial Research (CIRI-SDV), Alma Mater Studiorum - University of Bologna, Bologna, Italy*

**ID#99** **TrainAR project: integrating AR technology with wearable physiological signals monitoring for personalized physical training programs**

**C. Occhipinti [a], I. Bejaoui [b], P. Picerno [a], S.M.G. Solinas [a], U. Della Croce [a], C. De Marchis [b]**
*[a] University of Sassari, Sassari, Italy; [b] University of Messina, Messina, Italy*

**ID#104** **Outpatient rehabilitation in a chronic stroke patient focused on motor control: the significant support of motion analysis**

**G. Dazzi [a], D. Coraci [a], P. Contessa [b], V. Lazzar [b], M. De Gregorio [b], S. Masiero [a]**
*[a] University of Padova, Padova, Italy; [b] University Hospital Padua, Padua, Italy*

**ID#106** **Comparison of knee joint kinematics between generic and sport-specific agility tests in youth basketball players**

**R. Zinno [a], S. Pinelli [a], S. Di Paolo [b], A. Jòdar-Portas [c], A. Prats-Puig [c], L. Bragonzoni [a]**
*[a] Department of Life Quality Studies, University of Bologna, 47921 Rimini, Italy; [b] 2nd Orthopaedic and Traumatologic Clinic, IRCCS, Rizzoli Orthopaedic Institute, Bologna, Italy; [c] University School of Health and Sport (EUSES), University of Girona, Girona, Spain*

**ID#108** **Whole-body cryostimulation (WBC) to improve trunk mobility in individuals with fibromyalgia and comorbid obesity: preliminary results**

**S. Cerfoglio [a,b], F. Verme [b], J.M. Fontana [b], A. Alito [c], M. Galli [a], P. Capodaglio [b,d], V. Cimolin [a,b]**

*[a] Politecnico di Milano, Milan, Italy; [b] IRCCS Istituto Auxologico Italiano, Piancavallo, Italy; [c] University of Messina, Messina, Italy; [d] Univeristy of Turin, Turin, Italy*

**ID#116** **How non-specific low back pain affects gait kinematics: a systematic review and meta-analysis**

**F. Dal Farra [a], N. Lopomo [b], M. Fascia [a], E. Scalona [c], V. Cimolin [d]**

*[a] Dept. Information Engineering, University of Brescia, Brescia, Italy; [b] Dept. of Design, Politecnico of Milan; [c] Dept. of Medical and Surgical Specialties, Radiological Sciences and Public Health, University of Brescia, Brescia, Italy; [d] Department of Electronics, Information and Bioengineering, Politecnico di Milano, Milano, Italy*

**ID#119** **Biomechanical efficacy of botulinum toxin treatment on synergy between spine and lower limbs in camptocormia in Parkinson's disease**

**M. Bacchini [a], G. Chiari [a], M. Rossi [a], C. Bacchini [a], V. Brambilla [a]**

*[a] Don Carlo Gnocchi Foundation - Onlus - S. Maria ai Servi Center, Parma, Italy*

**ID#121** **Postural responses induced by intermittent visual occlusions in young and older adults**

**S. Guarducci [a], G. Panconi [b], V. Sorgente [b], L. Mucchi [a], D. Minciacchi [b], R. Bravi [b]**

*[a] Dept. of Information Engineering, Florence Univ., Florence, Italy; [b] Dept. of Experimental and Clinical Medicine, Florence Univ., Florence, Italy*

**ID#122** **Monitoring the insurgence of involuntary muscle activity and the development of spasticity after an ischemic stroke over a six-month period: a case study**

**L. Cavazzuti [a], A. Merlo [a], B. Damiano [a], S. Scaltriti [a], M. Zedde [b], F. Valzania [b], M. Lusuardi [c], I. Campanini [a]**

*[a] LAM - Motion Analysis Laboratory, Neuromotor and Rehabilitation Department, San Sebastiano Hospital, Azienda USL-IRCCS di Reggio Emilia, Correggio (Reggio Emilia), Italy; [b] Neurology Unit, Neuromotor & Rehabilitation Department, Azienda USL-IRCCS di Reggio Emilia, Reggio Emilia, Italy; [c] Neuromotor and Rehabilitation Department, Azienda USL-IRCCS Reggio Emilia, Correggio (Reggio Emilia), Italy.*

**ID#123** **Assessing upper body compensatory movements in people with upper limb prosthetics using the Arm Profile Score: a preliminary evaluation on healthy subjects**

**E. Braccili [a], L. Rum [a], E. Zimei [a], U. Della Croce [a], D. Anastasi [a]**

*[a] Università di Sassari, Sassari, Italy*

**ID#126** **A preliminary test to evaluate throwing performance in altered gravity conditions**

**I.G. Porco [a], A. Pica [a], E. Zimei [a], E. Braccili [a], S.M.G. Solinas [a], P. Picerno [a], U. Della Croce [a]**

*[a] Department of Biomedical Sciences, University of Sassari, Sassari, Italy*

**ID#127** **Postural control during quiet stance with different sensory conditions among female adolescents with idiopathic scoliosis: preliminary results**

**A.C. Panara [a], M. Mirando [b], L. Pedrotti [b,c], G. Rossi [a], C. Pezzi [a], M. Paramento [d,e], M. Rubega [d], E. Formaggio [d], E. Passarotto [d], P. Contessa [f], M.C. Maccarone [d,g], S. Masiero [d,f,g], A. Nardone [a,b]**

*[a] Centro Studi Attività Motorie (CSAM) and Neurorehabilitation and Spinal Units, ICS Maugeri SPA SB, Institute of Pavia, IRCCS, Pavia, Italy; [b] Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy; [c] Pediatric Orthopedic Clinic, "Istituto di Cura Città di Pavia", Pavia, Italy; [d] Department of Neurosciences, Section of Rehabilitation, University of Padova, Padova, Italy; [e] Department of Information Engineering, University of Padova, Padova, Italy; [f] Orthopedic Rehabilitation Unit, Padova University Hospital, Padova, Italy; [g] Padova Neuroscience Center, University of Padova, Padova, Italy*

**ID#128** **Balance and gait impairment in patients with cognitive decline in the elderly: a multidisciplinary assessment**

**G. Rossi [a], M. Mirando [b], A.C. Panara [a], G. Topi [b], C. Fundarò [c], R. Zupo [a], F. Castellana [d], R. Sardone [e,f], A. Nardone [a,b], S. Natoli [b,g], C. Pavese [a,b]**

*Centro Studi Attività Motorie (CSAM) and Neurorehabilitation and Spinal Units, ICS Maugeri SPA SB, Institute of Pavia, IRCCS, Pavia, Italy; [b] Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy; [c] Istituti Clinici Scientifici Maugeri IRCCS, Neurophysiopathology Unit Pavia-Montescano, Pavia Institute, Pavia, Italy; [d] Cesare Frugoni Internal & Geriatric Medicine & Memory Unit, University of Bari Aldo Moro, Bari, Italy; [e] Unit of Statistics and Epidemiology, Local Health Authority of Taranto, Taranto, Italy; [f] Department of Eye and Vision Sciences, University of Liverpool, Liverpool, UK; [g] Unit of Pain Therapy Service, Foundation "Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS) Policlinico San Matteo" Pavia, Italy*

16.00 Coffee break

## 17.00 PRESENTAZIONI ORALI 6
## Advanced Techniques in Movement Analysis

*Chairs: Zimi Sawacha, Joel Pollet*

### Detecting co-contractions among multiple muscles: a time-frequency perspective

**M. Morano [a], D. Borzelli [b], S. Fioretti [a], F. Di Nardo [a]**

*[a] Department of Information Engineering, Università Politecnica delle Marche, Ancona, Italy; [b] Department of Biomedical, Dental, Morphological and Functional Imaging Sciences, University of Messina, Messina, Italy*

### Neuromuscular control patterns in Parkinson's disease: comparison of different EMG-driven neuromusculoskeletal modelling approaches

**M. Dalle Vacche [a], G. Rigoni [a], F. Spolaor [a], D. Volpe [b], Z. Sawacha [a]**

*[a] University of Padova, Padova, Italy; [b] Fresco Parkinson Center, Villa Margherita, S. Stefano, Vicenza, Italy*

### One step towards gait-based Parkinson's disease classification

**E. Troisi Lopez [a], R. Minino [b], A. Romano [b], M.C. Corsi [c], P. Sorrentino [d], G. Sorrentino [b]**
*[a] Institute of Applied Sciences and Intelligent Systems, National Research Council, Pozzuoli, Italy; [b] Department of Medical, Motor and Wellness Sciences, University of Naples "Parthenope", Naples, Italy; [c] Sorbonne Université, Institut du Cerveau – Paris Brain Institute -ICM, CNRS, Inria, Inserm, AP-HP, Hopital de la Pitié Salpêtrière, F-75013, Paris, France; [d] Institut de Neurosciences des Systèmes, Aix-Marseille Université, 13005 Marseille, France*

### A novel image processing pipeline to enhance muscle fascicle tracking during gait

**E. Cesti [a,b], M. Boccardo [a,b], M. Carbonaro [a,b], G.L. Cerone [a,b], S. Seoni [b,c], K.M. Meiburger [b,c], A. Botter [a,b]**
*[a] Laboratory for Engineering of the Neuromuscular System (LISiN), Department of Electronics and Telecommunication, Politecnico di Torino, 10129 Torino, Italy; [b] PoliToBIOMed Laboratory, Politecnico di Torino, 10129 Torino, Italy; [c] Biolab, Department of Electronics and Telecommunications, Politecnico di Torino, 10129 Torino, Italy*

### A novel statistical approach for upper-limb movement segmentation using a single wrist-worn magneto-inertial measurement unit

**G. Dotti [a], M. Ghislieri [a], M. Knaflitz [a]**
*[a] Politecnico di Torino, Turin, 10129, Italy*

### A markerless platform for automatic assessment of gait

**R. Di Marco [a], M. Boldo [b], S. Aldegheri [a], E. Martini [b], M. Cosma [c], A. Baricich [d], G. Gasperini [e], A. Picelli [f], N. Smania [f], N. Bombieri [a]**
*[a] Dept. of Engineering for Innovation Medicine, University of Verona, Italy; [b] Dept. of Computer Science, University of Verona, Italy; [c] Physical Medicine Unit, Azienda Ospedaliero-Universitaria di Ferrara, Italy; [d] Department of Health Sciences, University of Piemonte Orientale, Italy; [e] Villa Beretta Rehabilitation Center, Italy; [f] Dept. of Neurosciences, Biomedicine and Movement Science, University of Verona, Italy*

### Upper limb joint kinematics resulting from a model conceived for the analysis of SHAP motor tasks performed by trans-radial amputees: discrepancies with the Vicon upper limb model joint kinematics

**E. Zimei [a], E. Braccili [a], D. Anastasi [a], U. Della Croce [a], L. Rum [a]**
*[a] University of Sassari, Sassari, Italy*

## 18.30 Assemblea soci SIAMOC

19.15 Conclusione della giornata

# SABATO 5/10

08.00 Registrazione Congresso

08.45 **Saluti e apertura del Presidente del Congresso**

## 09.00 PRESENTAZIONI ORALI 7
## Motor Development and Pediatric Disorders
*Chairs: Ilaria Carpinella, Marco Invernizzi*

### Quantitative analysis of motor performance in patients with Mowat Wilson Syndrome using inertial sensors
**M.C. Bisi [a], F. Sperandeo [b], A. Fetta [b], L. Bergonzini [b], A. Utili [c], L. Soliani [b], V. Di Pisa [b], D.M. Cordelli [b], R. Stagni [a]**
*[a] Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione "Guglielmo Marconi" – DEI, Università di Bologna, Bologna, Italy; [b] Dipartimento di Scienze Mediche e Chirurgiche, Alma Mater Studiorum, Università di Bologna, Bologna, Italy; [c] IRCCS Istituto delle Scienze Neurologiche di Bologna, U.O.C. Neuropsichiatria dell'età Pediatrica, Bologna, Italy*

### Does muscle fiber recruitment strategy in children with Fragile x syndrome differs from typically developing children during gait?
**F. Spolaor [a], F. Beghetti [b], W.J. Piatkowska [b], R. Polli [a], V. Liani [a], V.A. Marino [b], A. Murgia [a], Z. Sawacha [b]**
*[a] Department of Women's and Children's Health, University of Padua, Padua, Italy; [b] Department of Information Engineering, University of Padua, Padua, Italy*

### Protocol for upper limb motion analysis in children with cerebral palsy: a proposal for clinical practice
**C. Borghi [a], J. Verzelloni [b], D. Pandarese [a], S. Faccioli [a], S. Sassi [a]**
*[a] Children Rehabilitation Unit of Santa Maria Nuova Hospital, Azienda USL-IRCCS di Reggio Emilia, Reggio Emilia, Italy; [b] Child and Adolescent Neuropsychiatry Service (NPIA), Azienda USL di Modena, Sassuolo, Italy*

### Automated video-based General Movements analysis: sensitivity analysis of metrics in a population of very preterm infants
**A. Tomadin [a], M.C. Bisi [a], A. Aceti [b], A. Sansavini [c], R. Stagni [a]**
*[a] DEI-Unibo, Bologna, Italy; [b] DIMEC-Unibo, Bologna, Italy; [c] PSI-Unibo, Bologna, Italy*

### Open-loop and closed-loop control of upright stance in adolescents with idiopathic scoliosis
**M. Paramento [a,b], M. Rubega [a], E. Formaggio [a], E. Passarotto [a], P. Contessa [c], M.C. Maccarone [a,d], R. Fontana [c], H. Veronese [c], A.C. Panara [e], M. Mirando [f], C. Eyzautier [f], L. Pedrotti [f,g], A. Nardone [e,f], S. Masiero [a,c,d]**
*[a] Department of Neurosciences, Section of Rehabilitation, University of Padova, Padova, Italy; [b] Department of Information Engineering, University of Padova, Padova, Italy; [c] Orthopedic Rehabilitation Unit, Padova University Hospital, Padova, Italy; [d] Padova Neuroscience Center, University of Padova, Padova, Italy; [e] Centro Studi Attività Motorie (CSAM) and Neurorehabilitation and Spinal Units, ICS Maugeri SPA SB, Institute of Pavia, IRCCS, Pavia, Italy; [f] Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy; [g] Pediatric Orthopedic Clinic, "Istituto di Cura Città di Pavia", Pavia, Italy*

### Gait development in very-preterm toddlers: does locomotor trajectory differ from full-term pears' one?

**M.C. Bisi [a], A. Aceti [b], A. Tomadin [a], E. Benvenuti [b], V. Graziosi [c], A. Sansavini [c], L.T. Corvaglia [b], R. Stagni [a]**

*[a] Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione "Guglielmo Marconi", Università di Bologna, Bologna, Italy; [b] Dipartimento di Scienze Mediche e Chirurgiche, Università di Bologna, Bologna, Italy; [c] Dipartimento di Psicologia "Renzo Canestrari", Università di Bologna, Bologna, Italy*

## 10.15 LEZIONE MAGISTRALE 5

*Chair: Antonio Nardone*

### Walking along non-linear paths: prevention of falls and targeted rehabilitation procedures

**Prof. Marco Schieppati**

*Senior Professor of Human Physiology and Neurophysiology at the Universities of Milan, Genoa and Pavia, Italy*

Discussione

11.15 Coffee break

## 11.30 PRESENTAZIONI ORALI 8

## Frontiers in Gait Analysis

*Chair: Beatrice De Maria, Mariano Serrao*

### The influence of executive functions on gait kinematics during dual task walking evaluated by EEG and 3D Motion analysis

**A. Fullin [a], L. Gargiulo [b], F. Mancino [b], C.I. De Girolamo [a], E. Vallefuoco [c], N. Moccaldi [b], P. Arpaia [b], P. De Blasiis [d]**

*[a] Department of Advanced Biomedical Sciences, University of Naples Federico II, 80138 Naples, Italy; [b] Department of Electrical Engineering and Information Technologies, University of Naples Federico II, 80138 Naples, Italy; [c] Department of Psychology and Cognitive Science, University of Trento, 38122 Rovereto, Italy; [d] School of Engineering, University of Basilicata, 85100 Potenza, Italy*

### Does cortical activation pattern during treadmill walking change with a head stabilization task? An observational cross-sectional study in healthy subjects

**A. Torchio [a], F.G. Mestanza Mattos [b], J. Pollet [a], E. Gervasoni [a], C. Iester [c], L. Bonzano [c], M. Bove [c], D. Cattaneo [a, b]**

*[a] IRCCS Fondazione Don Carlo Gnocchi; [b] Università degli Studi di Milano; [c] Università di Genova*

### The effect of subtalar arthrodesis for the correction of adult acquired flat foot deformity on in-shoe plantar pressure

**P. Caravaggi [a], G. Rogati [a], C. Proietti De Marchis [a], A. Leardini [a], R, Bevoni [b], M. Girolami [b], L. Berti [c]**

*[a] Movement Analysis Laboratory and Functional Evaluation of Prostheses, IRCCS Istituto Ortopedico Rizzoli; [b] Bentivoglio Orthopaedic Ward, IRCCS Istituto Ortopedico Rizzoli; [c] Physical Medicine and Rehabilitation Unit, IRCCS Istituto Ortopedico Rizzoli*

### Using textile sensors to assess electromyographic activation patterns during gait

**F. Colelli Riano [a], F. Amitrano [a], A. De Rosa [a], G. Iaselli [a], A. Biancardi [a], A. Coccia [a], G. D'Addio [a]**

*[a] Istituti Clinici Scientifici Maugeri IRCCS, Bioengineering Unit of Telese Terme Institute, Italy*

### Dual-task disrupts gait smoothness in Parkinson's disease: a Timed Up and Go test study.

**A. Caronni [a,b], M. Amadei [a], L. Diana [c], G. Sangalli [c], S. Scarano [a,b], V. Rota [a], N. Bolognini [c,d]**

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## 12.30 Consegna premi e cerimonia di chiusura

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