



PROGRAMME
Saturday, 30th June

8.30-
9.30

KEYNOTE LECTURE I — BASMAJIAN AWARD LECTURE

Roger Enoka, University of Colorado Boulder

Decomposition of interference EMG signals recorded with surface electrodes

Chair: Deborah Falla, University of Birmingham

PARALLEL SESSIONS—SESSION 01

SESSION 01: Reflexes & Neural Pathways

Chairs: Kemal S. Türker, Koc University and Richard Carson, Trinity College Dublin

SESSION 01.1

Functionally relevant changes in interlimb and intralimb cutaneous reflex excitability from the hand during standing with stable versus unstable light touch

AUTHORS: John E Misiaszek, Heather Hackett, Sydney Chodan

AFFILIATIONS: University of Alberta

9.30

SESSION 01.2

Impact of a sensory perturbation on somatosensory evoked potentials and motor learning for the non-dominant hand

AUTHORS: Paul Yields¹, Ryan Gilley², Bernadette Murphy²

AFFILIATIONS: ¹University of Ontario Institute of Technology, Deakin University,

²University of Ontario Institute of Technology

9.45

SESSION 01.3

Body position changes the amplitude of the H-reflex

AUTHORS: Serpil Cecen¹, Imran Khan Niazi², Rasmus Nedergaard², Heidi Haavik², Kemal Türker³

AFFILIATIONS: ¹Marmara University, ²New Zealand College of Chiropractic, ³KOC University School of Medicine

10.00

SESSION 01.4

Static stretching of plantar flexors decreases mechanical reflex excitability as revealed by the Achilles tendon tap

AUTHORS: Eugen Gallasch¹, Rafolt Dietmar², Monica Christova¹, Markus Tilp³, Francesco Budini³

AFFILIATIONS: ¹Medical University of Graz, ²Medical University of Vienna, ³Graz University

10.15

SESSION 01.5

Multiple descending pathways may contribute to the response of the gastrocnemius to transcranial magnetic stimulation

AUTHORS: Jonathan Shemmell¹, James Stinear², Colum MacKinnon³, Daniel Ribeiro⁴, Carrie Falling⁴

AFFILIATIONS: ¹University of Wollongong, ²University of Auckland, ³University of Minnesota, ⁴University of Otago

10.30

11.00-
12.00

COFFEE, POSTER SESSION I & EXHIBITION TIME
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PARALLEL SESSIONS

SYMPOSIUM S1:

High Density Surface EMG: A Non-Invasive Research Tool at the Transition to Clinical Applications

Chairs: Ales Holobar, University of Maribor; Bernd Lapatki, University of Ulm; Hans van Dijk, University of Ulm

9.30 SYMPOSIUM S1.1

High-density EMG: from the first ideas to a routine method in muscle electrophysiology

AUTHORS: Dick Stegeman

AFFILIATIONS: Radboud University Medical Centre

9.45 SYMPOSIUM S1.2

Motor unit territory assessment: high-density and scanning EMG

AUTHORS: Johannes van Dijk, Bernd Lapatki

AFFILIATIONS: University of Ulm

10.00 SYMPOSIUM S1.3

On coherence between cumulative motor unit spike trains and NMF components of high-density electromyograms

AUTHORS: Ales Holobar¹, Martin Savc¹, Vojko Glaser¹, Imre Cikaljo², Zlatko Matjacic²

AFFILIATIONS: ¹University of Maribor, Faculty of Electrical Engineering and Computer Science, ²University Rehabilitation Institute, Republic of Slovenia - Soca

10.15 SYMPOSIUM S1.4

Physiology and anatomy of the complete facial musculature assessed from high-density surface EMG

AUTHORS: Bernd Lapatki¹, Alisa Barth¹, Johanna Radeke¹, Ales Holobar², Johannes van Dijk¹

AFFILIATIONS: ¹University of Ulm, ²University of Maribor

10.30 SYMPOSIUM S1.5

The role of HD-EMG in Cerebral Palsy: Implications for research and clinical practice

AUTHORS: Lukas G Wiedemann¹, Ales Holobar², Amy Hogan³, Sarah Ward¹, Eewei Lim, Andrew McDaid¹

AFFILIATIONS: ¹University of Auckland, ²University of Maribor, ³Cerebral Palsy Society of NZ, Starship Childrens' Health

10.45 SYMPOSIUM S1.6

Aging, lifestyle-related disease, exercise, nutrition, and motor unit firing pattern in humans - Challenges to resolve Japanese social issue using HDsEMG

AUTHORS: Kohei Watanabe

AFFILIATIONS: Chukyo University

11.00-12.00 COFFEE, POSTER SESSION I & EXHIBITION TIME

Coffee Break Sponsored by Noraxon USA

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PARALLEL SESSIONS

SYMPOSIUM S2:

Muscle Stiffness and Extensibility: How Do They Affect Muscle Function?

Chair: Massimiliano Ditroilo, University College Dublin

SYMPOSIUM S2.1

Introduction and overview of stiffness measurement

9.30

AUTHORS: Massimiliano Ditroilo

AFFILIATIONS: University College Dublin, Ireland

SYMPOSIUM S2.2

Muscle stiffness relates to athletic performance and injury risk status

9.45

AUTHORS: Mark Watsford

AFFILIATIONS: University of Technology Sydney, Australia

SYMPOSIUM S2.3

Effects of age, sex and fatigue on musculoskeletal stiffness

10.00

AUTHORS: Aurélio Faria

AFFILIATIONS: University of Beira Interior, Portugal

SYMPOSIUM S2.4

Leg stiffness during hopping with and without biological legs

10.15

AUTHORS: Satoru Hashizume

AFFILIATIONS: National Institute of Advanced Industrial Science and Technology, Tokyo, Japan

11.00-
12.00

COFFEE, POSTER SESSION I & EXHIBITION TIME

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PARALLEL SESSIONS

SESSION O2 :

Rehabilitation Therapies and Technologies

Chairs: William Z Rymer, Northwestern University and Winston Byblow, University of Auckland

9.30	<p>SESSION O2.1 Lower limb EMG activity of chronic stroke patients when using a novel gait-retraining device AUTHORS: Sarah Ward, Lukas Wiedemann, Cathy Stinear, James Stinear, Andrew McDaid AFFILIATIONS: University of Auckland</p>
9.45	<p>SESSION O2.2 Multisite stimulation to reduce fatigue associated with functional electrical stimulation AUTHORS: Andrew J Fuglevand, Alie Buckmire AFFILIATIONS: University of Arizona, College of Medicine</p>
10.00	<p>SESSION O2.3 Long-term effects of providing ankle-foot orthoses after stroke on tibialis anterior muscle activation patterns AUTHORS: Corien Nikamp, Jaap Buurke, Leendert Schaake, Johan Rietman, Hermie Hermens AFFILIATIONS: Roessingh Research & Development</p>
10.15	<p>SESSION O2.4 The effect of long-term treatment with transcranial pulsed electromagnetic fields on sit-to-stand performance in persons with Parkinson's disease AUTHORS: Anne Sofie B Malling¹, Bo Morberg¹, Lene Wermuth¹, Ole Gredal², Per Bech³, Bente Jensen¹ AFFILIATIONS: ¹Odense University Hospital, University of Southern Denmark, ²The Danish Rehabilitation Centre for Neuromuscular Diseases, ³Psychiatric Centre North Zealand, University of Copenhagen</p>
10.30	<p>SESSION O2.5 Effects of transcutaneous electrical spinal cord stimulation on spinal excitability in individuals with incomplete spinal cord injury AUTHORS: Christian Meyer¹, Ursula Hofstötter², Michèle Hubli¹, Björn Zörner¹, Armin Curt¹, Marc Bolliger¹ AFFILIATIONS: ¹University Hospital Balgrist, ²Medical University Vienna</p>
10.45	<p>SESSION O2.6 Time course of the effects of botulinum toxin on voluntary activation and on reflex responses of spastic motoneurons in biceps brachii muscles based on surface EMG recordings AUTHORS: Babak Afsharipour, Sourav Chandra, William Rymer, Nina Suresh AFFILIATIONS: Northwestern University; Shirley Ryan Ability Lab</p>
11.00-12.00	<p>COFFEE, POSTER SESSION I & EXHIBITION TIME Coffee Break Sponsored by Noraxon USA</p>

PARALLEL SESSIONS

SESSION O3:

Rehabilitation Therapies and Technologies

Chairs: Minoru Shinohara, Georgia Institute of Technology and Pascal Madeleine, Aalborg University

9.30	<p>SESSION O3.1 Muscle synergy extraction using principal activations only: is this information more useful in clinics and robotic control with respect to a classical muscle synergy analysis? AUTHORS: Marco Knaflitz, Valentina Agostini, Daniele Rimini, Marco Ghislieri, Cristina Castagneri, Samanta Rosati, Gabriella Balestra AFFILIATIONS: Politecnico di Torino</p>
9.45	<p>SESSION O3.2 Changes in the timing but not the structure of muscle synergies are associated with changes in gait after treatment in cerebral palsy AUTHORS: Benjamin R Shuman¹, Marije Goudriaan², Kaat Desloovere², Michael Schwartz³, Katherine Steele¹ AFFILIATIONS: ¹University of Washington, ²KU Leuven, ³Gillette Children Specialty Healthcare and University of Minnesota</p>
10.00	<p>SESSION O3.3 Divergence in temporal coordination of kinematic synergies during non-preferred stride time-length combinations AUTHORS: Benio Kibushi, Motoki Kouzaki AFFILIATIONS: Kyoto university</p>
10.15	<p>SESSION O3.4 The generalization of Motor Adaptation is explained through the recruitment of previously adapted muscle synergies AUTHORS: Cristiano De Marchis¹, Jacopo Di Somma¹, Magdalena Zych², Silvia Conforto¹, Giacomo Severini² AFFILIATIONS: ¹University Roma TRE, ²University College Dublin</p>
10.30	<p>SESSION O3.5 Lower-extremities motor adaptations during asymmetric cycling AUTHORS: Magdalena Zych, Ian Rankin, Donal Holland, Giacomo Severini AFFILIATIONS: University College Dublin</p>
11.00-12.00	<p>COFFEE, POSTER SESSION I & EXHIBITION TIME Coffee Break Sponsored by Noraxon USA</p>

PARALLEL SESSIONS

SESSION O4:

Knee Biomechanics and Rehabilitation I

Chairs: Catherine Disselhorst-Klug, RWTH Aachen University and Natalie Collins, University of Queensland

12.00	<p>SESSION O4.1 Shape analysis of inter-joint motion coupling patterns in a stair-descent task following ACL reconstruction captures asymmetries in coordination up to two years post-surgery relative to non-injured controls AUTHORS: Dario Liebermann¹, Jonas Markström², Jonas Selling², Charlotte Häger² AFFILIATIONS: ¹Tel-Aviv University, ²Umeå University</p>
12.15	<p>SESSION O4.2 Regional activation of the vastus medialis and lateralis in a dynamic task differs between females with and without patellofemoral pain and is associated with knee extension strength AUTHORS: Alessio Gallina¹, James Wakeling², Paul Hodges³, Michael Hunt¹, Jayne Garland⁴ AFFILIATIONS: ¹University of British Columbia, ²Simon Fraser University, ³University of Queensland, ⁴Western Ontario University</p>
12.30	<p>SESSION O4.3 Participants with patellofemoral pain show reduced torque steadiness and higher motor unit discharge rate variability of their knee extensors during open and closed kinetic chain exercises AUTHORS: Eduardo Martinez-Valdes¹, Gennaro Boccia², Maryam Nawaz¹, Francesco Negro³, Alberto Rainoldi², Deborah Falla¹ AFFILIATIONS: ¹University of Birmingham, ²University of Turin, ³University of Brescia</p>
12.45	<p>SESSION O4.4 Reflex changes in ACL deficient knees during normal and surprise landings AUTHORS: Yu Konishi¹, Peter McNair², David Rice² AFFILIATIONS: ¹National Defense Academy, ²Auckland University of Technology</p>

LUNCH, POSTER SESSION I & EXHIBITION TIME

13.00-14.00 Special Symposium

14.00 Fundamentals and possibilities of electrical muscle stimulation
 sponsored by MTG, O'Reilly Hall

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PARALLEL SESSIONS

SYMPOSIUM S3:

Why Are Muscles Weak After Stroke?

Chair: William Z. Rymer, Northwestern University

SYMPOSIUM S3.1

Why Are Muscles Weak After Stroke?

12.00

AUTHORS:

William Z Rymer¹, Nina Suresh¹, Jongsang Son¹, Xiaogang Hu²

AFFILIATIONS: ¹Shirley Ryan AbilityLab, ²University of North Carolina

SYMPOSIUM S3.2

Altered fascicle behavior of medical gastrocnemius in chronic stroke survivors

12.15

AUTHORS: Jongsang Son¹, Sabrina S.M. Lee², William Rymer¹

AFFILIATIONS: ¹Shirley Ryan AbilityLab (formerly Rehabilitation Institute of Chicago),
²Northwestern University

SYMPOSIUM S3.3

Relative Contribution of Different Altered Motor Unit Control to Muscle Weakness in Stroke

12.30

AUTHORS: Xiaogang Hu¹, William Z Rymer², Nina Suresh³

AFFILIATIONS: ¹University of North Carolina-Chapel Hill, ²Northwestern University,
³Rehabilitation Institute of Chicago

SYMPOSIUM S3.4

Contributions from altered motoneuron regulation after hemispheric stroke

12.45

AUTHORS: Nina Suresh¹, Xiaogang Hu², William Rymer^{1 3}

AFFILIATIONS: ¹Shirley Ryan Ability Lab, ²University of North Carolina Chapel Hill,
³Northwestern University

LUNCH, POSTER SESSION I & EXHIBITION TIME

13.00-

Special Symposium

14.00

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PARALLEL SESSIONS

SESSION O5:

Back, Neck and Shoulder Pain I

Chairs: Birgit Juul-Kristensen, University of Southern Denmark and Deborah Falla, University Of Birmingham

12.00	<p>SESSION O5.1 Relation between the degree of specific low back pain and activation of the erector spinae muscles during tasks of daily life</p> <p>AUTHORS: Sebastian Becker¹, Ferdinand Bergamo¹, Klaus Schnake², Ingo Rembitzki³, Catherine Disselhorst-Klug¹</p> <p>AFFILIATIONS: ¹Institute of Applied Medical Engineering, RWTH Aachen University, ²Schön Clinic Fürth Nuremberg, ³Otto Bock Health Care</p>
12.15	<p>SESSION O5.2 People with chronic low back pain show differences in the spatial distribution of erector spinae activity during an endurance task</p> <p>AUTHORS: Andrew Sanderson, Eduardo Martinez-Valdes, Carlos Murillo, Nicola Heneghan, Alison Rushton, Deborah Falla</p> <p>AFFILIATIONS: University of Birmingham</p>
12.30	<p>SESSION O5.3 Accuracy of Trunk Muscle Activation Patterns to Predict Low Back Reinjury</p> <p>AUTHORS: D-Adam Quirk, Cheryl Hubley-Kozey</p> <p>AFFILIATIONS: Dalhousie University</p>
12.45	<p>SESSION O5.4 The effects of lumbar posture on back extensor torque and trunk muscle activation in patients with chronic low back pain during maximal lifting</p> <p>AUTHORS: Grant A Mawston, Mark Boocock, Laura Holder</p> <p>AFFILIATIONS: Auckland University of Technology</p>
13.00-14.00	<p>LUNCH, POSTER SESSION I & EXHIBITION TIME</p> <p>Special Symposium Fundamentals and possibilities of electrical muscle stimulation sponsored by MTG, O'Reilly Hall</p> <p>MTG We have many dreams</p>

PARALLEL SESSIONS

SESSION O6:

Motor Control II

Chairs: Dick Stegeman, University of Nijmegen and Gabriella Balestra, Politecnico di Torino

SESSION O6.1

Distinct neural control of intrinsic and extrinsic muscles of the hand during isometric single finger presses

12.00

AUTHORS: Sigrid S Dupan¹, Dick Stegeman¹, Huub Maas²

AFFILIATIONS: ¹Donders Institute for Brain, Cognition, and Behaviour, ²Vrije Universiteit Amsterdam, Amsterdam Movement Sciences

SESSION O6.2

Physical interaction with a circular constraint

12.15

AUTHORS: James R Hermus¹, Joseph Doeringer², Dagmar Sternad³, Neville Hogan¹

AFFILIATIONS: ¹Massachusetts Institute of Technology, ²HighRes Biosolutions, ³Northeastern University

SESSION O6.3

Elbow joint angle and biceps brachii muscle-length separately influence spinal, but not corticospinal, excitability to the biceps brachii

12.30

AUTHORS: Michael Holmes¹, Davis Forman², Daniel Abdel-Malek², Christopher Bunce¹,

AFFILIATIONS: ¹Brock University, ²University of Ontario Institute of Technology

SESSION O6.4

Low-frequency fluctuations in motor output are distinctively associated with beta-band and gamma-band neural oscillations during steady contraction

12.45

AUTHORS: Ellenor Brown, Minoru Shinohara

AFFILIATIONS: Georgia Institute of Technology

LUNCH, POSTER SESSION I & EXHIBITION TIME

13.00-

Special Symposium

14.00

Fundamentals and possibilities of electrical muscle stimulation
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PARALLEL SESSIONS

SESSION 07:

Gait & Posture I

Chairs: Giuseppe De Vito, University College Dublin and Bente Jensen, University of Southern Denmark

12.00	SESSION 07.1 Tri-axial changes in postural sway predictability in people with Parkinson's disease over 36 months AUTHORS: Annette L Pantall, Silvia Del Din, Lynn Rochester AFFILIATIONS: Newcastle University
12.15	SESSION 07.2 Small, movement-dependent postural perturbations substantially alter postural control in healthy young adults AUTHORS: Dasa Gorjan, Jan Babic, Zrinka Potocanac AFFILIATIONS: Jozef Stefan Institute
12.30	SESSION 07.3 Long-term retention of split-belt walking reveals differences in spatiotemporal gait adaptation and dynamic balance control AUTHORS: Tom J.W Buurke, Claudine Lamothe, Danique Vervoort, Lucas van der Woude, Rob den Otter AFFILIATIONS: University of Groningen, University Medical Center Groningen
12.45	SESSION 07.4 Structure of surface EMGs from intrinsic foot muscle is affected by postural task demand AUTHORS: Elisabetta Ferrari ¹ , Neil Reeves ¹ , Glen Cooper ² , Emma Hodson-Tole ¹ AFFILIATIONS: ¹ Manchester Metropolitan University, ² University of Manchester
13.00-14.00	LUNCH, POSTER SESSION I & EXHIBITION TIME Special Symposium Fundamentals and possibilities of electrical muscle stimulation sponsored by MTG, O'Reilly Hall

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14.00-
15.00**KEYNOTE LECTURE 2**

Todd A. Kuiken, Shirley Ryan Ability Lab, Chicago
Building Bionics
Chair: Madeleine Lowery, University College Dublin

PARALLEL SESSIONS**SYMPOSIUM S4****SYMPOSIUM S4**

Multimodal Biomarkers of Motor Performance, Impairment and Recovery Derived from Physiological Measurements

Chairs: Vincent C.K. Cheung, Chinese University of Hong Kong; Giacomo Severini, University College Dublin

15.00

SYMPOSIUM S4.1

Clinical applications of synergy analyses to evaluate pediatric movement disorders in cerebral palsy and muscular dystrophy

AUTHORS: Benjamin R Shuman¹, Marije Goudriaan², Kaat Desloovere², Michael Schwartz³, Katherine Steele¹

AFFILIATIONS: ¹University of Washington, ²KU Leuven, ³Gillette Children Specialty Healthcare and University of Minnesota

15.15

SYMPOSIUM S4.2

Biomarkers of proportional recovery from upper and lower limb impairment after stroke

AUTHORS: Winston D Byblow

AFFILIATIONS: University of Auckland

15.30

SYMPOSIUM S4.3

Neurophysiological Biomarkers extracted from high-density EMG

AUTHORS: Margherita Castronovo, Dario Farina

AFFILIATIONS: Imperial College London

15.45

SYMPOSIUM S4.4

Neuroimaging-derived biomarkers of chronic pelvic pain in the motor system

AUTHORS: Jason Kutch

AFFILIATIONS: University of Southern California

16.00

SYMPOSIUM S4.5

EMG-derived muscle-synergy patterns as recovery biomarkers in stroke survivors: Results from a Multi-Center Collaboration

AUTHORS: Vincent CK Cheung

AFFILIATIONS: The Chinese University of Hong Kong

16.30-
17.30**COFFEE, POSTER SESSION I & EXHIBITION TIME**17.30-
18.30**KEYNOTE LECTURE 3**

Apostolos P. Georgopoulos, University of Minnesota

The role of motor cortical inhibitory mechanisms in movement specification and control
Chair: Richard Carson, Trinity College Dublin

18.30-
19.30**STUDENT SKILLS EXCHANGE**

PARALLEL SESSIONS

SYMPOSIUM S5:

Biomechanical and Clinical Challenges in the Shoulder from the Applied Perspective
Chair: Birgit Juul-Kristensen, University of Southern Denmark

15.00	SYMPOSIUM S5.1 Scapula kinematics and gleno-humeral dynamic control in handball players with and without pain AUTHORS: Jesper Bencke AFFILIATIONS: Copenhagen University Hospital
15.15	SYMPOSIUM S5.2 Ultrasound measurements of the Subacromial space and its usefulness in treatment of shoulder tendinopathy AUTHORS: Karen McCreesh AFFILIATIONS: University of Limerick
15.30	SYMPOSIUM S5.3 Surface EMG activity of the upper trapezius before and after a single dry needling session in female office workers with trapezius myalgia AUTHORS: Barbara Cagnie, Kayleigh De Meulemeester AFFILIATIONS: Ghent University
15.45	SYMPOSIUM S5.4 Marker-based scapula movement in clinical tests - methodological considerations and guidelines for practical application AUTHORS: Uwe G Kersting, Gunhild Hansen AFFILIATIONS: Aalborg University
16.00	SYMPOSIUM S5.5 Assessment of hand-held and isokinetic measures of shoulder rotator strength AUTHORS: Camilla M Larsen ^{1, 2} , Claus Bech ¹ , Morten Brødsted ¹ , Behnam Liaghat ¹ , Ann Cools ³ , Karen Søgaard ¹ , Birgit Juul-Kristensen ¹ AFFILIATIONS: ¹ University of Southern Denmark ² University College Lillebaelt ³ Gent University, University of Copenhagen

16.30-
17.30

COFFEE, POSTER SESSION I & EXHIBITION TIME

KEYNOTE LECTURE 3 - O'REILLY HALL

17.30-
18.30 Apostolos P. Georgopoulos, University of Minnesota
The role of motor cortical inhibitory mechanisms in movement specification and control
Chair: Richard Carson, Trinity College Dublin

18.30-
19.30

STUDENT SKILLS EXCHANGE

PARALLEL SESSIONS

SESSION O8: Knee Biomechanics and Rehabilitation II

Chairs: Karen Sogaard, University Of Southern Denmark and Kit Vaughan, University of Capetown

15.00 **SESSION O8.1** Kinematic analysis of the talocrural and subtalar joint after lateral compartments ligaments resection: can motion changes be detected by 4D-CT acquisition?
AUTHORS: Luca Buzzatti¹, Benyameen Keelson¹, Jildert Apperloo¹, Nico Buls², Gert Van Gompel², Thierry Scheerlinck², Jef Vandemeulebroucke¹, Michel De Maeseneer², Jean-Pierre Baeyens¹, Johan De Mey², Erik Cattryse¹
AFFILIATIONS: ¹Vrije Universiteit Brussel, ²UZ Brussel - Vrije Universiteit Brussel

15.15 **SESSION O8.2** Differential quadriceps muscle activation after a femoral nerve blockade prior an anterior cruciate ligament reconstrucion
AUTHORS: Rony A Silvestre¹, Iver Cristi-Sánchez², Julian Aliste³, Daniela Bravo³, Vicente Cristi¹
AFFILIATIONS: ¹Clinica MEDS, ²Universidad Mayor, ³Hospital Clínico Universidad de Chile

15.30 **SESSION O8.3** Lower limb kinematics and kinetics of a novel one-leg double-hop test involving unanticipated/anticipated diagonal hops in individuals with unilateral anterior cruciate ligament reconstruction
AUTHORS: Ashokan Arumugam, Jonas Markström, Charlotte Häger
AFFILIATIONS: Umeå University

15.45 **SESSION O8.4** Does the Loss of Vastus Medialis Alter Patellofemoral Joint Contact Pressures In Vivo?
AUTHORS: Seong-won Han, Andrew Sawatsky, Azim Jinha, Walter Herzog
AFFILIATIONS: The University of Calgary

16.00 **SESSION O8.5** 3D Hip and knee kinematics during single and triple hop tests after ACL reconstruction as measured with inertial measurement units
AUTHORS: Jasper Reenalda¹, Erik Maartens¹, Roy Hoogeslag², Rianne Huis in't Veld², Brian Noehren³, Jaap Buurke¹
AFFILIATIONS: ¹Roessingh Research and Development, University of Twente, ²OCON orthopedic clinic, ³University of Kentucky

16.15 **SESSION O8.6** Thirty minutes of treadmill walking significantly alters knee muscle activation and joint biomechanics in asymptomatic individuals and people with moderate knee osteoarthritis
AUTHORS: Derek J Rutherford, Matthew Baker, William Stanish
AFFILIATIONS: Dalhousie University

16.30-17.30 **COFFEE, POSTER SESSION I & EXHIBITION TIME**

17.30-18.30 **KEYNOTE LECTURE 3 - O'REILLY HALL**
Apostolos P. Georgopoulos, University of Minnesota
The role of motor cortical inhibitory mechanisms in movement specification and control
Chair: Richard Carson, Trinity College Dublin

18.30-19.30 **STUDENT SKILLS EXCHANGE**

PARALLEL SESSIONS

SESSION O9:

EMG Modeling & Processing I - Modeling,

Chairs: Hermie Hermens, Roessingh Research and Development and Andrew Hamilton-Wright, University Of Guelph

15.00	SESSION O9.1 Mathematical Analysis of a Model of Intracellular Action Potential Generation AUTHORS: Eike Petersen, Philipp Rostalski AFFILIATIONS: University of Lübeck
15.15	SESSION O9.2 Influence of index flexion and abduction on the EMG signals recorded from the first dorsal interosseous muscle: an electrophysiological model based on diffusion tensor imaging AUTHORS: Diego Pereira Botelho ¹ , Niall Colgan ² , Kathleen Curran ¹ , Madeleine Lowery ¹ AFFILIATIONS: ¹ University College Dublin, ² National University of Ireland
15.30	SESSION O9.3 Influence of the conduction properties of muscle tissue on surface motor unit action potentials AUTHORS: Alessio Puleo ¹ , Paola Contessa ² , Marco Knaflitz ¹ AFFILIATIONS: ¹ Politecnico di Torino, ² Delsys inc.
15.45	SESSION O9.4 The specific impedance of the intra-fascicle environment obtained via nerve fibre models AUTHORS: James Hope ¹ , Frederique Vanholsbeeck ^{1,2} , Andrew McDaid ¹ AFFILIATIONS: ¹ University of Auckland, ² The Dodd-Walls Centre for Photonic and Quantum Technologies
16.00	SESSION O9.5 Modeling the synaptic input to motor neurons in spastic muscles AUTHORS: Catherine Disselhorst-Klug, Kathrin Koch AFFILIATIONS: Institute for Applied Medical Engineering, RWTH Aachen University
16.15	SESSION O9.6 Modelling voluntary contraction of knee extensors using a motor unit recruitment model AUTHORS: Ekin Altan, Leonardo Gizzi, Oliver Röhrle AFFILIATIONS: University of Stuttgart

**16.30-
17.30**

COFFEE, POSTER SESSION I & EXHIBITION TIME

17.30- 18.30	KEYNOTE LECTURE 3 - O'REILLY HALL Apostolos P. Georgopoulos, University of Minnesota The role of motor cortical inhibitory mechanisms in movement specification and control Chair: Richard Carson, Trinity College Dublin
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**18.30-
19.30**

STUDENT SKILLS EXCHANGE

PARALLEL SESSIONS

SESSION O10:

Motor Units

Chairs: Nina Suresh, Northwestern University and David Gabriel, Brock University

SESSION O10.1

A novel insertion technique for intramuscular measurement of EMG activity of the deep intrinsic foot muscles during walking

15.00

AUTHORS: Natalie J Collins, Sauro Salomoni, Edith Elgueta-Cancino, Kylie Tucker, Paul Hodges

AFFILIATIONS: The University of Queensland

SESSION O10.2

Influence of muscle length on motor unit discharge rates in the tibialis anterior muscle

15.15

AUTHORS: Claudio Orizio, Marta Cogliati, Alessandro Cudicio, Francesco Negro

AFFILIATIONS: University of Brescia

SESSION O10.3

Decomposition of surface EMG Signals from Activities of Daily Living

15.30

AUTHORS: Joshua C Kline, Bhawna Shiwani, Serge Roy, John Chiodini, Gianluca De Luca

AFFILIATIONS: Delsys, Inc and Altec, Inc

SESSION O10.4

Estimation of the neural drive during vibration exercise by high-density surface-electromyography decomposition

15.45

AUTHORS: Lin Xu¹, Yu Xu¹, Francesco Negro², Dario Farina³, Massimo Mischi¹

AFFILIATIONS: ¹Eindhoven University of Technology, ²Università degli Studi di Brescia, Brescia, Italy, ³Imperial college London

SESSION O10.5

Sex-related differences in motor unit behaviour at 20, 40, 60, 80 and 100 percent of maximal isometric voluntary contraction.

16.00

AUTHORS: J Greig Inglis, Justin Parro, David Gabriel

AFFILIATIONS: Brock University

SESSION O10.6

Relationship between motor unit coherence and nonlinear surface EMG features during isometric contraction

16.15

AUTHORS: Lara McManus, Matthew Flood, Madeleine Lowery

AFFILIATIONS: University College Dublin

16.30-
17.30

COFFEE, POSTER SESSION I & EXHIBITION TIME

KEYNOTE LECTURE 3 - O'REILLY HALL

17.30- Apostolos P. Georgopoulos, University of Minnesota

18.30 The role of motor cortical inhibitory mechanisms in movement specification and control
Chair: Richard Carson, Trinity College Dublin

18.30-
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STUDENT SKILLS EXCHANGE



PROGRAMME

Sunday, 1st July

8.30-
9.30

KEYNOTE LECTURE 4

Cathy Stinear, University of Auckland

Prediction of motor recovery after stroke: advances in biomarkers

Chair: Brian Caulfield, University College Dublin

PARALLEL SESSIONS

SYMPOSIUM S6

SYMPOSIUM S6:

EMG Signal Decomposition: Validation and Impact In Our Physiological Understanding of Neural Control of Movement

Chairs: Dario Farina, Imperial College London and Ales Holobar, University of Maribor

9.30

SYMPOSIUM S6.1

Identification of motor unit firings at different speeds of dynamic muscle contractions

AUTHORS: Ales Holobar, Vojko Glaser

AFFILIATIONS: University of Maribor, Faculty of Electrical Engineering and Computer Science

9.50

SYMPOSIUM S6.2

Motor unit firing properties in the biceps brachii of hemiparetic stroke survivors studied using template-based recognition algorithms: contributions to muscle weakness

AUTHORS: William Z Rymer

AFFILIATIONS: Shirley Ryan AbilityLab

10.10

SYMPOSIUM S6.3

Associations between motor unit activity during steady isometric contractions with lower leg muscles and mobility in older adults and persons with multiple sclerosis

AUTHORS: Roger M Enoka, AM Almuklass, D Mani, T Vieira, A Botter

AFFILIATIONS: University of Colorado

10.30

SYMPOSIUM S6.4

Identifying the organization of synaptic input to motoneurons in humans

AUTHORS: CJ Heckman

AFFILIATIONS: Northwestern University

10.45

SYMPOSIUM S6.5

Motor unit Population Analysis from High-Density EMG

AUTHORS: Dario Farina

AFFILIATIONS: Imperial College

11.00-
12.00

COFFEE, POSTER SESSION II & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O11:

Reflexes & Neural Pathways II

Chairs: Andrew Fuglevand, University of Arizona and Jonathan Shemmell, University Of Wollongong

9.30	<p>SESSION O11.1 Wrist stretch reflex responses are modulated by expectancy AUTHORS: Karen Rodriguez, Winfred Mugge, Alfred Schouten AFFILIATIONS: TU Delft</p>
9.45	<p>SESSION O11.2 Cold-water immersion of a single limb reduces inhibition and enhances facilitation in the motor cortex of the opposite limb AUTHORS: Justin Kavanagh, Eden Delahunty, Daniel Mckeown, Jacob Thorstensen AFFILIATIONS: Griffith University</p>
10.00	<p>SESSION O11.3 The Interference Of Tonic Frontalis Muscle Activity On The EEG Signal AUTHORS: Gizem Yilmaz, Abdullah Salih Budan, Kemal S. Türker AFFILIATIONS: Koc University</p>
10.15	<p>SESSION O11.4 Effect of aerobic exercise on electroencephalogram parameters and cognitive functions in patients with mild cognitive impairment AUTHORS: Imran Khan Niazi¹, Imran Amjad², Hamza Ghazanfar Mehmood Toor², Hina Afzal², Mads Jochumsen³, Muhmmad Shafiq², Kathryn Allen¹, Heidi Haavik¹, Touqeer Ahmed⁴ AFFILIATIONS: ¹New Zealand College Of Chiropractic, ²Riphah International University, ³Aalborg University, ⁴National University of Science and Technology</p>
10.30	<p>SESSION O11.5 A single session using a novel music-motor therapy app increases corticomotor excitability in healthy young adults AUTHORS: Katherine Hankinson¹, Alex Shaykevich¹, Jennifer Rodger², Christopher Etherton-Beer¹, Michael Rosenberg¹, Ann-Maree Vallence³ AFFILIATIONS: ¹University of Western Australia, ²Perron Institute for Neurology and Translational Neuroscience, ³Murdoch University</p>
10.45	<p>SESSION O11.6 Reliability of corticomotor excitability analyses using transcranial magnetic stimulation on two lower extremity muscles AUTHORS: Yo Shih, Christopher Powers, Beth Fisher AFFILIATIONS: University of Southern California</p>

11.00-
12.00

COFFEE, POSTER SESSION II & EXHIBITION TIME

PARALLEL SESSIONS

SYMPOSIUM S7:

Ultrasound Elastography – What Are We Measuring in Muscle?

Chairs: Sabrina Lee, Northwestern University; Eric Perreault, Northwestern University & Tom Sandercock, Northwestern University

9.30

SYMPOSIUM S7.1

Temperature Decouples the Effects of Stiffness and Tension on Ultrasound Shear Wave Velocity

AUTHORS: Thomas G Sandercock, Michel Bernabei, Sabrina S. M. Lee, Eric J. Perreault

AFFILIATIONS: Northwestern University

9.45

SYMPOSIUM S7.2

Shear Wave Velocity Varies in Human Muscles with Different Architectures Even When Activated to the Same Percent of Maximal Force

AUTHORS: Michel Bernabei, Thomas Sandercock, Eric Perreault, Sabrina SM Lee

AFFILIATIONS: Northwestern University

10.00

SYMPOSIUM S7.3

Physiologic and Technical Considerations for Implementing Shear Wave Elastography in Musculoskeletal Applications

AUTHORS: Sarah Eby, Zaiyang Long, Donald Tradup, Shigao Chen, Hugo Giambini, Katrina Glazebrook, Nicholas Hangiandreou, Kristin Zhao

AFFILIATIONS: Mayo Clinic

10.15

SYMPOSIUM S7.4

Shear-wave elastography in various muscles and conditions in humans

AUTHORS: Minoru Shinohara¹, Yasuhide Yoshitake²

AFFILIATIONS: ¹Georgia Institute of Technology, ²National Institute of Fitness and Sports in Kanoya

11.00-
12.00

COFFEE, POSTER SESSION II & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O12:

Sports Biomechanics,

Chairs: Francesco Felici, University of Rome Foro Italico and Sarah Ward, University of Bath

9.30	SESSION O12.1 Influence of ankle taping and drop landing height on time of muscular pre-activation AUTHORS: Eric Jenkins, Daniel Russell, Courtney Armitano AFFILIATIONS: Old Dominion University
9.45	SESSION O12.2 Ankle Stability - Which muscles are essential for stabilization AUTHORS: Michael Asmussen, Ryan Peters, Tyler Cluff, Benno Nigg AFFILIATIONS: University of Calgary
10.00	SESSION O12.3 Reactive Agility Responses in Collegiate Tennis Players after 8-Weeks Whole Body Vibration Training AUTHORS: Ismail Bayram ¹ , Ali Onur Cerrah ¹ , Abdullah Ruhi Soylu ² , Hayri Ertan ¹ AFFILIATIONS: ¹ Anadolu University, ² Hacettepe University
10.15	SESSION O12.4 Torque sharing between hamstring muscle heads is individual-specific and is related to motor performance AUTHORS: Simon Avrillon ¹ , Gaël Guilhem ¹ , François Hug ² AFFILIATIONS: ¹ French Institute of Sport (INSEP), ² University of Nantes
10.30	SESSION O12.5 Sub-Optimal Hydration Impairs Muscle Contraction Speed in Forearm Muscles AUTHORS: Lewis J Macgregor, Angus Hunter AFFILIATIONS: University of Stirling
10.45	SESSION O12.6 Location of innervation zone on pectoralis major muscle and its shift during the bench press exercise AUTHORS: Hélio V Cabral, Leonardo de Souza, Felipe Mancebo, Liliam Oliveira, Taian Vieira AFFILIATIONS: Federal University of Rio de Janeiro

11.00-
12.00

COFFEE, POSTER SESSION II & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O13:

Clinical Neuromechanics

Chairs: Jayne Garland, Western University and Monica Busse-Morris, Cardiff University

- | | |
|-------|--|
| 9.30 | <p>SESSION O13.1</p> <p>The effects of forearm rotation on forearm muscle recruitment patterns during dynamic wrist flexion and extension contractions using a haptic wrist robot</p> <p>AUTHORS: Garrick N Forman¹, Davis Forman², Edwin Avila-Mireles³, Jacopo Zenzeri³, Mike Holmes¹</p> <p>AFFILIATIONS: ¹Brock University, ²University of Ontario Institute of Technology, ³Istituto Italiano di Tecnologia</p> |
| 9.45 | <p>SESSION O13.2</p> <p>What are the immediate effects of foot orthosis geometry on lower limb EMG activity and foot biomechanics?</p> <p>AUTHORS: Joanna Reeves¹, Richard Jones¹, Anmin Liu¹, Leah Bent², Chris Nester¹</p> <p>AFFILIATIONS: ¹University of Salford, ²University of Guelph</p> |
| 10.00 | <p>SESSION O13.3</p> <p>Integrating Neurocognition into Clinical Single-Leg Hop Tests</p> <p>AUTHORS: Janet E Simon, Nathan Millikan, Dustin Grooms</p> <p>AFFILIATIONS: Ohio University</p> |
| 10.15 | <p>SESSION O13.4</p> <p>Increased time-pressure results in a less cautious obstacle crossing strategy in subjects with and without simulated visual impairment</p> <p>AUTHORS: Tjerk Zult¹, Jonathan Allsop², Matthew Timmis³, Shahina Pardhan¹</p> <p>AFFILIATIONS: ¹School of Medicine, Anglia Ruskin University, Cambridge, United Kingdom, ²Royal Air Force College Cranwell, Sleaford, United Kingdom, ³Anglia Ruskin University, Cambridge, United Kingdom</p> |
| 10.30 | <p>SESSION O13.5</p> <p>Spread of Botulinum Toxin Type-A into Non-injected Antagonistic Muscles Affects Their Mechanics against Treatment Aims</p> <p>AUTHORS: Filiz Ates¹, Can Yucesoy²</p> <p>AFFILIATIONS: ¹Mayo Clinic, ²Bogazici University</p> |
| 10.45 | <p>SESSION O13.6</p> <p>Lumbar posture and muscle recruitment during repetitive manual handling in young and older males.</p> <p>AUTHORS: Grant A Mawston^{1, 2}, Mark Boocock², Steve Taylor¹</p> <p>AFFILIATIONS: ¹Auckland University of Technology, ²AUT University</p> |

11.00-
12.00

COFFEE, POSTER SESSION II & EXHIBITION TIME

PARALLEL SESSIONS

SYMPOSIUM S8: Novel Approaches to Enhance Recovery After Central Nervous System Injury
Chairs: Monica Perez, University of Miami; Jose Pons, Cajal Institute Spanish National Research Council

12.00	SYMPOSIUM S8.1 Non-invasive brain stimulation AUTHORS: Antonio Oliviero AFFILIATIONS: FENNSI Group, Hospital Nacional de Paraplégicos, SESCAM, Toledo, Spain
12.15	SYMPOSIUM S8.2 Activity-dependent therapies to facilitate manual dexterity recovery in spinal cord injured rats AUTHORS: Guillermo Garcia-alias AFFILIATIONS: Department of Cell Biology, Physiology and Immunology & Institut of Neurosciences, Universitat Autònoma de Barcelona; Centro Investigación Biomédica en Red Enfermedades Neurodegenerativas (CIBERNED) and Hospital de Neurorehabilitació, Institut Guttmann, Barcelona, Spain
12.30	SYMPOSIUM S8.3 Associative neurorehabilitation with Rehab robotics and neuroprosthetics AUTHORS: Jose Pons AFFILIATIONS: Neural Rehabilitation Group, Cajal Institute, Spain
12.45	SYMPOSIUM S8.4 Noninvasive Approaches to Promote Functional Recovery in Humans with Spinal Cord Injury AUTHORS: Monica A. Perez AFFILIATIONS: University of Miami
13.00-14.00	LUNCH, POSTER SESSION II & EXHIBITION TIME Special Symposium Advances in EMG Technology & Clinical Gait Analysis Examples sponsored by Noraxon USA, O'Reilly Hall

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PARALLEL SESSIONS

SESSION O14:

Back, Neck & Shoulder Pain II

Chairs: Naira Campbell-Kyureghyan, University Of Wisconsin and Kylie Tucker, University Of Queensland

SESSION O14.1

12.00

Altered lumbar biomechanics in pregnant women during trunk flexion-extension

AUTHORS: Daniel Sánchez-Zuriaga¹, Gemma Biviá-Roig², Juan Francisco Lisón²

AFFILIATIONS: ¹Universitat de València, ²University CEU-Cardenal Herrera

SESSION O14.2

12.15

Lumbar kinematics and fear-avoidance beliefs in relation to disability and workability in patients with low back pain. A longitudinal study

AUTHORS: Anne Lovise Nordstoga, Ottar Vasseljen, Tom Ivar Nilsen, Ingebrigt Meisingset, Monica Unsgaard-Tøndel

AFFILIATIONS: Norwegian University of Science and technology

SESSION O14.3

12.30

Shear wave elastography reveals differences in lumbar erector spinae muscle stiffness in individuals with low back pain

AUTHORS: Carlos Murillo, Deborah Falla, Alison Rushton, Andrew Sanderson, Nicola Heneghan

AFFILIATIONS: Centre of precision rehabilitation for spinal pain, University of Birmingham

SESSION O14.4

12.45

Eight weeks of training with EMG-biofeedback and the effect on pain and function in patients with subacromial impingement - a randomised controlled trial

AUTHORS: Birgit Juul-Kristensen¹, Camilla Marie Larsen², Henrik Eshøj³, Trine Holt Clemmensen², Anders Hansen⁴, Peter Bo Jensen¹, Eleanor Boyle⁵, Karen Søgaard¹

AFFILIATIONS: ¹University of Southern Denmark, ²University College Lillebaelt and University of Southern Denmark, ³Odense University Hospital, ⁴Odense University Hospital, and University of Southern Denmark, ⁵University of Toronto, and University of Southern Denmark

LUNCH, POSTER SESSION II & EXHIBITION TIME

13.00-

Special Symposium

14.00

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PARALLEL SESSIONS

SESSION O15:

Motor Control III

Chairs: Kevin Keenan, University of Wisconsin and Tanya Ivanova, Western University

12.00

SESSION O15.1

Each individual has unique muscle activation signatures

AUTHORS: Francois Hug¹, Marion Crouzier¹, Thibault Deschamps¹, Sylvain Dorel¹, Kylie Tucker², Lilian Lacourpaille¹

AFFILIATIONS: ¹University of Nantes, ²The University of Queensland

12.15

SESSION O15.2

Simultaneous and proportional control of combined finger movements

AUTHORS: Sigrid S Dupan¹, Martyna Stachaczyk², Ivan Vujaklija², Janne Hahne³, Dick Stegeman¹, Strahinja Dosen⁴, Dario Farina²

AFFILIATIONS: ¹Donders Institute for Brain, Cognition, and Behaviour, ²Imperial College London, ³University Medical Center Goettingen, ⁴Aalborg University

12.30

SESSION O15.3

Violinists' muscular load during violin performance

AUTHORS: Stephanie Reesen Mann¹, Mads Panduro², Ruben Wendelboe Hansen¹, Helene M Paarup², Lars Brandt², Karen Sogaard¹

AFFILIATIONS: ¹University of Southern Denmark, ²Odense University Hospital

12.45

SESSION O15.4

sEMG-based Speech Recognition for People with Laryngectomy

AUTHORS: Serge H Roy¹, Geoffrey Meltzner², James Heaton³, Deng Yunbin⁴, Gianluca De Luca¹, Bhawna Shiwani¹, Matthew Carroll¹, Joshua Kline¹

AFFILIATIONS: ¹Delsys Inc, ²Vocal ID, ³Harvard Medical School, ⁴BAE Systems, Inc.

13.00-
14.00

LUNCH, POSTER SESSION II & EXHIBITION TIME

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PARALLEL SESSIONS

SESSION O16:

Gait & Posture II

Chairs: Gerold Ebenbichler, Vienna Medical University and Kohei Watanabe, Chukyo University

SESSION O16.1

Postural performance after bilateral or unilateral total hip arthroplasty

AUTHORS: Roberto Gatti, Federico Temporiti, Roberta Furone, Mattia Loppini, Cecilia Gandolfi, Guido Grappiolo

AFFILIATIONS: Humanitas Clinical and Research Center, Humanitas University

12.00

SESSION O16.2

Kinematic gait variability of individuals with a transfemoral amputation

AUTHORS: Erik Prinsen¹, Jaap Buurke¹, Bart Koopman², Hans Rietman¹

AFFILIATIONS: ¹Roessingh Research and Development, ²University of Twente

12.15

SESSION O16.3

Trunk and neck movements are reduced in people with chronic neck pain walking along a curved trajectory

AUTHORS: Alessandro Marco De Nunzio, Feras Alsultan, Ross Whalley, Syed Ahmad, Deborah Falla

AFFILIATIONS: School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham

12.30

SESSION O16.4

Electromyographic analysis of the up and down step: comparative dry and water

AUTHORS: Manuel González Sánchez¹, Jaime Martín-Martín², David Pérez-Cruzado², Antonio Cuesta-Vargas³

AFFILIATIONS: ¹Universidad de Málaga, ²Catholic University San Antonio of Murcia, ³Universidad de Málaga and Queensland University Technology, Brisbane, Australia

12.45

LUNCH, POSTER SESSION II & EXHIBITION TIME

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13.00-

14.00

PARALLEL SESSIONS

SESSION O17:

EMG Modeling & Processing II - Signal Analysis

Chairs: Ted Clancy, Worcester Polytechnic Institute and Javier Navallas, Universidad Publica de Navarra

12.00	SESSION O17.1 A Signal Quality Index for Electrode Location using Single-channel surface EMG features AUTHORS: Yiyang Shi, Dawn MacIsaac, Philip Parker AFFILIATIONS: University of New Brunswick
12.15	SESSION O17.2 Multi-channel analysis of the electrohysterogram by Entropy-based features to predict preterm birth and detect labor AUTHORS: Chiara Rabotti, Massimo Mischi, Beijing Ding, Hinke de Lau, Beatrijs van der Hout, Guid Oei AFFILIATIONS: Eindhoven University of Technology
12.30	SESSION O17.3 Long-Term Reliability Of Motor Unit Discharge Rates In The Flexor Carpi Radialis Obtained By Decomposition Of The Surface Electromyographic Signal AUTHORS: Thomas B Hoshizaki, Robert Kumar, J. Greig Inglis, Lara Green, David Gabriel AFFILIATIONS: Brock University
12.45	SESSION O17.4 Amplitude cancellation impairs the ability of the rectified EMG to reflect the neural drive to muscles AUTHORS: Jakob L Dideriksen ¹ , Dario Farina ² AFFILIATIONS: ¹ Aalborg University, ² Imperial College London

LUNCH, POSTER SESSION II & EXHIBITION TIME

13.00-14.00 Special Symposium
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PARALLEL SESSIONS

SESSION O18:

Fatigue I

Chairs: Alberto Rainoldi, University of Turin and Justin Kavanagh, Griffith University

15.00	SESSION O18.1 Is the control scheme of motor unit behavior altered during muscle fatigue? AUTHORS: Paola Contessa, John Letizi, Gianluca De Luca, Joshua Kline AFFILIATIONS: Delsys and Altec Inc
15.15	SESSION O18.2 Neck muscle fatigue affects somatosensory evoked potentials and impacts motor skill acquisition and retention of a hand tracking task AUTHORS: Bernadette A Murphy, Mahboobeh Zabihhosseini, Paul Yelder, Rufeida Cosgun, Ushani Ambalavanar AFFILIATIONS: University of Ontario Institute of Technology
15.30	SESSION O18.3 Exploring the physiological mechanisms of caffeine in a non-fatigued state and during fatiguing exercise - responders versus non-responders AUTHORS: Ricardo Mesquita ¹ , Heikki Kyröläinen ² , Neil Cronin ² , Jukka Hintikka ² , Janne Avela ² AFFILIATIONS: ¹ Edith Cowan University, ² University of Jyväskylä
15.45	SESSION O18.4 A motor unit-based model of muscle fatigue and recovery AUTHORS: Jim R Potvin ¹ , Andrew Fuglevand ² AFFILIATIONS: ¹ McMaster University, ² University of Arizona
16.00	SESSION O18.5 Can Subjective Maximal Voluntary Contraction Be Measured Objectively? AUTHORS: Kemal Turker ¹ , Betilay Topkara Arslan ¹ , İlhan Karacan ² , Nurdan Paker ² , Evrim Coskun Celik ² , Beatrice Selen Senocak ¹ , Mustafa Gorkem Ozyurt ¹ AFFILIATIONS: ¹ Koc University, ² Istanbul Physical Medicine Rehabilitation Training and Research Hospital

16.30-
17.30

COFFEE, POSTER SESSION II & EXHIBITION TIME

CONFERENCE DINNER IN GUINNESS STOREHOUSE

Please check bus schedule on page 70

PARALLEL SESSIONS

SYMPOSIUM S9:

An Increased Reliance on Contralesional Cortico-reticulospinal Motor Pathways and Sensorimotor Impairments following a unilateral brain injury: Good or Bad?

Chair: Julius P.A. Dewald, Northwestern University

15.00	SYMPOSIUM S9.1 The monoaminergic component of the reticulospinal system AUTHORS: CJ Heckman AFFILIATIONS: Northwestern University
15.20	SYMPOSIUM S9.2 The reticulospinal tract and recovery of hand function: second best is better than nothing AUTHORS: Stuart Baker AFFILIATIONS: Newcastle University
15.40	SYMPOSIUM S9.3 Rate Modulation and further evidence for changes in persistent inward currents during isometric dynamic torque tasks in chronic hemiparetic stroke AUTHORS: Altamash S Hassan ¹ , Mark Cummings ¹ , C.J. Heckman ¹ , Laura McPherson ² , Julius Dewald ¹ AFFILIATIONS: ¹ Northwestern University, ² Florida International University
16.00	SYMPOSIUM S9.4 Evidence for an increased dependence on contralesional corticoreticulospinal pathways as a form of maladaptive plasticity post hemiparetic stroke AUTHORS: Julius Dewald AFFILIATIONS: Northwestern University Feinberg School of Medicine

**16.30-
17.30**

COFFEE, POSTER SESSION II & EXHIBITION TIME

CONFERENCE DINNER IN GUINNESS STOREHOUSE

Please check bus schedule on page 70

14.00-
15.00

KEYNOTE LECTURE 5 CARLO DE LUCA MEMORIAL LECTURE
 Walter Herzog, University of Calgary
 Individual Muscle Forces in Human Movement
 Chair: Giuseppe De Vito, University College Dublin

PARALLEL SESSIONS

SYMPOSIUM S10

SYMPOSIUM S10:

Neuromechanics of Joint Stability After Anterior Cruciate Ligament Reconstruction

Chairs: Luca Laudani, Cardiff Metropolitan University; Andrea Macaluso, University of Rome Foro Italico

15.00

SYMPOSIUM S10.1

Neuromuscular requirements for joint stability during sports with high risk of acute knee injuries

AUTHORS: Jesper Bencke^{1,2}, Per Aagaard³, Mette Zebis⁴

AFFILIATIONS: ¹Hvidovre Hospital, ²Copenhagen University Hospital, ³University of Southern Denmark, ⁴Metropolitan University College

15.15

SYMPOSIUM S10.2

Tibiofemoral joint contact forces following ACL reconstruction and the association with cartilage and subchondral bone pathologies

AUTHORS: Adam L Bryant

AFFILIATIONS: The University of Melbourne

15.30

SYMPOSIUM S10.3

Longitudinal assessment of anticipatory and compensatory strategies following anterior cruciate reconstruction

AUTHORS: Luca Laudani¹, Luciana Labanca², Jacopo Rocchi², Pier Paolo Mariani², Andrea Macaluso²

AFFILIATIONS: ¹Cardiff Metropolitan University, ²University Of Rome "Foro Italico"

15.45

SYMPOSIUM S10.4

Novel rehabilitation principles to target deficits after ACL reconstruction

AUTHORS: Alli Gokeler

AFFILIATIONS: University Medical Center Groningen, Univeristy of Groningen

16.00

SYMPOSIUM S10.5

A novel early exercise intervention following ACL reconstruction: neuromuscular electrical stimulation superimposed on movement

AUTHORS: Andrea Macaluso¹, Luciana Labanca², Jacopo Emanuele Rocchi¹, Luca Laudani³, Pier Paolo Mariani¹

AFFILIATIONS: ¹University of Rome Foro Italico; Villa Stuart Sport Clinic, FIFA Medical Centre of Excellence, ²University of Rome Foro Italico, ³Cardiff Metropolitan University

16.30-
17.30

COFFEE, POSTER SESSION II & EXHIBITION TIME

CONFERENCE DINNER IN GUINNESS STOREHOUSE

Please check bus schedule on page 70

PARALLEL SESSIONS

SESSION O19:

Muscle and Force

Chairs: Walter Herzog, University of Calgary and Thomas Sandercock, Northwestern University

15.00	<p>SESSION O19.1 Why do muscles lose force potential when activated within their agonistic group? AUTHORS: Daiani de Campos¹, Heiliane de Brito Fontana¹, Andrew Sawatsky², Seong-won Han², Walter Herzog² AFFILIATIONS: ¹Universidade Federal de Santa Catarina, ²University of Calgary</p>
15.15	<p>SESSION O19.2 Is explosive strength affected by fascicle tendon interactions? AUTHORS: Robin Hager¹, Dorel Sylvain², Nordez Antoine², Thomas Poulard², Gaël Guilhem¹ AFFILIATIONS: ¹INSEP, ²Université de Nantes</p>
15.30	<p>SESSION O19.3 Measuring In Vivo Muscle Architecture Parameters to Determine Changes in Optimal Fascicle Length and Physiological Cross Sectional Area Following Hemiparetic Stroke: Preliminary Findings AUTHORS: Amy N Adkins, Lindsay Garmirian, Christa Nelson, Julius Dewald, Wendy Murray AFFILIATIONS: Northwestern University</p>
15.45	<p>SESSION O19.4 Muscle belly gearing differs between gastrocnemius medialis and lateralis during submaximal isometric contractions AUTHORS: Susann Wolfram¹, Emma Hodson-Tole² AFFILIATIONS: ¹University of Bath, ²Manchester Metropolitan University</p>
16.00	<p>SESSION O19.5 Does the shear wave propagation velocity behave in accordance with the uneven myoelectric activity of rectus femoris during hip flexion contractions? AUTHORS: Liliam F Oliveira¹, Thomas Bonis², Hélio Cabral¹, Leonardo de Souza¹, Remi Rouffaud³ AFFILIATIONS: ¹Federal University of Rio de Janeiro, ²Université de Strasbourg, ³Université François-Rabelais de Tours</p>
16.15	<p>SESSION O19.6 Identification of time-varying joint impedance using single trial data AUTHORS: Mark L van de Ruit¹, Gaia Cavallo², John Lataire², Winfred Mugge¹, Frans van der Helm¹, Jan-Willem van Wingerden¹, Alfred Schouten¹ AFFILIATIONS: ¹Delft University of Technology, ²Vrije Universiteit Brussel</p>
16.30-17.30	<p>COFFEE, POSTER SESSION II & EXHIBITION TIME</p>

CONFERENCE DINNER IN GUINNESS STOREHOUSE

Please check bus schedule on page 70



PROGRAMME

Monday, 2nd July

8.30-
9.30

KEYNOTE LECTURE 6

Peter Brown, University of Oxford

Developing Closed-loop Deep Brain Stimulation for the treatment of Parkinson's Disease and Essential Tremor

Chair: Eric Perreault, Northwestern University

PARALLEL SESSIONS

SYMPOSIUM S11

SYMPOSIUM S11:

Neuromechanical Adaptations After Training and Exercise

Chairs: Francesco Negro, University of Brescia, Claudio Orizio, University of Brescia

9.30

SYMPOSIUM S11.1

The motor unit plasticity under the influence of a strength training, endurance training and functional muscle overload

AUTHORS: Jan Celichowski

AFFILIATIONS: University School of Physical Education in Poznan

9.45

SYMPOSIUM S11.2

Training-Related Changes In Motor Coordination: Balance Exercises And Sports Medicine

AUTHORS: Anderson Oliveira

AFFILIATIONS: Aalborg University

10.00

SYMPOSIUM S11.3

Changes in the behavior of longitudinally-tracked motor units following four weeks of isometric strength training

AUTHORS: Alessandro Del Vecchio¹, Andrea Casolo², Francesco Negro³, Ilenia Bazzucchi², Francesco Felici², Dario Farina¹

AFFILIATIONS: ¹Imperial College London, ²University of Rome "Foro Italico", ³University of Brescia

10.15

SYMPOSIUM S11.4

Differential changes in motor unit properties following either endurance or high-intensity interval training: New insights with high-density surface EMG decomposition techniques

AUTHORS: Eduardo Martinez-Valdes¹, Deborah Falla¹, Francesco Negro², Dario Farina³

AFFILIATIONS: ¹University of Birmingham, ²University of Brescia, ³Imperial College London

10.30

SYMPOSIUM S11.5

Adaptations in the common synaptic input to populations of motor neurons after motor learning

AUTHORS: Francesco Negro¹, Alessandro Del Vecchio², Farina Dario², Claudio Orizio¹

AFFILIATIONS: ¹Universita' degli Studi di Brescia, ²Imperial College of London

11.00-
12.00

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SYMPOSIUM S12:

Symposium: New Insights into Trunk Control in Back Pain Through Novel Approaches
Chair: Paul Hodges, University of Queensland

9.30	SYMPOSIUM S12.1 New ways to probe and measure spine movement quality and motor control AUTHORS: Ryan Graham AFFILIATIONS: University of Ottawa
9.45	SYMPOSIUM S12.2 Understanding the biology of muscle changes in low back pain and injury: Time dependent mechanisms that modify the capacity of muscle to move and control the spine AUTHORS: Paul W Hodges AFFILIATIONS: The University of Queensland
10.00	SYMPOSIUM S12.3 New insights into trunk muscle control in low back pain revealed with high-density surface electromyography AUTHORS: Deborah Falla AFFILIATIONS: University of Birmingham
10.15	SYMPOSIUM S12.4 Mapping the nervous system organization and function of trunk muscles in low back pain: insights from brain stimulation and withdrawal reflexes AUTHORS: Hugo Masse Alarie AFFILIATIONS: Université Laval
10.30	SYMPOSIUM S12.5 Linear and non-linear analysis of individual adaptations during gait in low back pain AUTHORS: Wolbert van den Hoorn AFFILIATIONS: The University of Queensland
11.00-12.00	COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O20:

Fatigue II

Chairs: Roberto Merletti, Politecnico di Torino and Dawn MacIsaac, University of New Brunswick

SESSION O20.1

9.30

Muscle electrical activity changes over time during stair ascending until exhaustion

AUTHORS: Amitava Halder¹, Johan Swärd¹, Kalev Kuklane¹, Andreas Jakobsson¹, Michael Miller¹, Jeannette Unge¹, Siyeon Kim², Chuansi Gao¹

AFFILIATIONS: ¹Lund University, ²Seoul National University

SESSION O20.2

9.45

Effect of Dynamic Muscle Fatigue on Knee Extensors Maximal Strength and Torque Steadiness in Young and Older Individuals

AUTHORS: Rui Wu¹, Eamonn Delahunty¹, Massimiliano Ditroilo¹, Madeleine Lowery¹, Carlo Ferri Marini², Giuseppe De Vito¹

AFFILIATIONS: ¹University College Dublin, ²University of Urbino Carlo Bo

SESSION O20.3

10.00

Postural position sequences correlate to perceived pain and fatigue

AUTHORS: Andrew Hamilton-Wright¹, Nancy Black², Josh Lange¹, Clément Bouet², Mariah Martin Shein³, Marthe Samson², Maxime Lecanelier²

AFFILIATIONS: ¹University of Guelph, ²Université de Moncton, ³University of Waterloo

SESSION O20.4

10.15

Central and peripheral fatigue affects maximal, but not submaximal, rate of force development in runners

AUTHORS: Gennaro Boccia¹, Davide Dardanella¹, Paolo Brustio¹, Cantor Tarperi², Luca Festa², Barbara Pellegrini², Antonio La Torre³, Federico Schena², Alberto Rainoldi¹

AFFILIATIONS: ¹University of Turin, ²University of Verona, ³University of Milan

SESSION O20.5

10.30

Additional Insight Into Biarticular Muscle Function: The Influence Of Hip Flexor Fatigue On Rectus Femoris Activity At The Knee

AUTHORS: Matt S Stock¹, Jennah Hernandez², Jesus Ortegon², Jacob Mota³, Joshua Carr⁴

AFFILIATIONS: ¹University of Central Florida, ²Texas Tech University, ³University of North Carolina, Chapel Hill, ⁴University of Oklahoma

SESSION O20.6

10.45

The central nervous system adapts toward a more balanced force distribution between synergist muscles during a fatiguing task

AUTHORS: Lilian Lacourpaille, Marion Crouzier, François Hug

AFFILIATIONS: University of Nantes

11.00-
12.00

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O2I:

Gait & Posture III

Chair: Annette Pantell, Newcastle University and John Miasiazek, University of Alberta

SESSION O2I.1

Extraction of the principal EMG-activations in 100 children during gait: analysis of rectus femoris and vastus medialis

9.30
AUTHORS: Marco Knaflitz, Valentina Agostini, Cristina Castagneri, Samanta Rosati, Gabriella Balestra

AFFILIATIONS: Politecnico di Torino

SESSION O2I.2

Are older adults able to modify anticipatory postural adjustments following balance perturbations in gait initiation?

9.45
AUTHORS: Lorenzo Rum¹, Giuseppe Vannozzi¹, Emanuele Giartosio¹, Andrea Macaluso¹, Luca Laudani²

AFFILIATIONS: ¹University of Rome "Foro Italico", ²Cardiff Metropolitan University

SESSION O2I.3

Walking with visual perturbations but not an attention-dividing task modulates muscle coactivation patterns in old adults

10.00
AUTHORS: Samuel A Acuña¹, Carrie Francis², Jason Franz³, Darryl Thelen¹
AFFILIATIONS: ¹University of Wisconsin-Madison, ²University of Northwestern²St. Paul, ³University of North Carolina and North Carolina State University

SESSION O2I.4

A Strong Medial-Lateral and Anterior-Posterior Coupling During Single-Leg Stance is Related to Muscle Activity Modulation in Seniors

10.15
AUTHORS: Lars Donath, Ralf Roth, Eduard Kurz
AFFILIATIONS: German Sport University Cologne

SESSION O2I.5

Exploring SEMG-based biomarkers to detect early signs of sarcopenia: age-specific differences in the time-frequency representation of SEMG data recorded during a submaximal cyclic back extension exercise

10.30
AUTHORS: Gerold Ebenbichler¹, Richard Habenicht², Paolo Bonato³, Josef Kollmitzer⁴, Sara Riegler², Lena Unterlechner², Patrick Mair⁵, Thomas Kienbacher²

AFFILIATIONS: ¹Vienna Medical University, ²Karl-Landsteiner-Institute of Outpatient Rehabilitation Research, ³Harvard Medical School, Spaulding Rehabilitation Hospital, ⁴Technical School of Engineering, ⁵Harvard University

SESSION O2I.6

Muscular activation in vibration perturbed human walking

10.45
AUTHORS: Francesco Felici¹, Ilenia Bazzucchi¹, Enrico Marchetti², Luigi Fattorini³, Cristian Ieno¹, Marco Tarabini⁴, Angelo Tirabasso²

AFFILIATIONS: ¹Rome University "Foro Italico", ²Italian National Institute for Insurance against Accidents at Work, ³Rome University "La Sapienza", ⁴Politecnico di Milano

**11.00-
12.00**

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O22:

Myoelectric Control

Chairs: Levi Hargrove, Northwestern University and Richard Weir, University of Colorado

9.30	<p>SESSION O22.1 Improving two-channel myoelectric control performance through spatial information enhancement AUTHORS: Jiayuan He¹, Xinjun Sheng², Xiangyang Zhu², Ning Jiang¹ AFFILIATIONS: ¹University of Waterloo, ²Shanghai Jiao Tong University</p>
9.45	<p>SESSION O22.2 Myo-ART: A surface EMG augmented reality tool AUTHORS: Marco Gazzoni, Luigi Cerone AFFILIATIONS: Politecnico di Torino</p>
10.00	<p>SESSION O22.3 Motor Unit Drive (MU Drive) Improves Over Myoelectric Signals for Upper-limb Prosthetic Control AUTHORS: Joshua C Kline¹, Michael Twardowski¹, Serge Roy¹, Zhi Li², Gianluca De Luca¹ AFFILIATIONS: ¹Delsys, Inc and Altec, Inc, ²Robotics Engineering, Worcester Polytechnic Institute</p>
10.15	<p>SESSION O22.4 Adapting Myoelectric Pattern Recognition in a Virtual Environment AUTHORS: Richard B Woodward, Levi J Hargrove AFFILIATIONS: Shirley Ryan AbilityLab</p>
10.30	<p>SESSION O22.5 Reachy, a 3D-printed human-like robotic arm as a test bed for prosthesis control strategies AUTHORS: Sébastien Mick¹, Matthieu Lapeyre², Christophe Halgand¹, Florent Paclet¹, Daniel Cattaert¹, Pierre-Yves Oudeyer³, Aymar de Rugy¹ AFFILIATIONS: ¹INRIA - UMR 5287 - CNRS, ²Pollen Robotics, ³Inria Bordeaux Sud-Ouest</p>
10.45	<p>SESSION O22.6 Sensory and motor parameter estimation for elbow myoelectric control with vibrotactile feedback AUTHORS: Matthieu Guémann¹, Sandra Bouvier¹, Christophe Halgand¹, Léo Borrini², Florent Paclet¹, Eric Lapeyre², Damien Ricard², Daniel Cattaert¹, Aymar de Rugy¹ AFFILIATIONS: ¹INRIA CNRS, ²Army instruction Hospital</p>

11.00-12.00

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O23:

Motor Control IV

Chairs: Stuart Baker, Newcastle University and CJ Heckman, Northwestern University

- | | |
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| 12.00 | <p>SESSION O23.1
Do neural modulations contribute to force enhancement during and after the stretch-shortening cycle?
AUTHORS: Frank Schulz^{1, 2}, Brent Raiteri², Daniel Hahn²
AFFILIATIONS: ¹Ruhr-Universität Bochum, ²Faculty of Sport Science, RUB</p> |
| 12.15 | <p>SESSION O23.2
Agonist and antagonist activation during dynamic functional tasks in a synergistic muscle pair
AUTHORS: Paola Contessa, Serge Roy, Gianluca De Luca, Joshua Kline
AFFILIATIONS: Delsys and Altec Inc</p> |
| 12.30 | <p>SESSION O23.3
The Neuromuscular Mechanisms and Motor Learning Adaptations Contributing to Cross Education in the Upper and Lower Limbs
AUTHORS: Lara A Green, David Gabriel
AFFILIATIONS: Brock University</p> |
| 12.45 | <p>SESSION O23.4
Neuromechanical coupling within the triceps surae muscle group and its consequence on force sharing
AUTHORS: Marion Crouzier¹, Lilian Lacourpaille¹, Antoine Nordez¹, Kylie Tucker², François Hug¹
AFFILIATIONS: ¹Université de Nantes, ²University of Queensland</p> |

13.00-
14.00

LUNCH, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SYMPOSIUM S13:

Insights into Cognitive Processes from Motor System Measurements

Chair: Simon Kelly, University College Dublin

12.00 **SESSION: S13.1**
Active braking of whole-arm reaching movements provides single-trial neuromuscular measures of movement cancellation
AUTHORS: Brian D Corneil¹, Jeroen Atsma², Femke Majj², Chao Gu¹, Pieter Medendorp²
AFFILIATIONS: ¹Western University, ²Donders Centre for Cognition, Radboud University

12.20 **SESSION: S13.2**
Intensified motor activity makes for faster responses when deciding under speed pressure
AUTHORS: Natalie A Steinemann¹, Redmond O'Connell², Simon Kelly³
AFFILIATIONS: ¹Columbia University, ²Trinity College Dublin, ³University College Dublin

12.40 **SESSION: S13.3**
Reaction time fractionning with EMG: what can muscles tell us about mental processes
AUTHORS: Boris Burle
AFFILIATIONS: Aix-Marseille Université, CNRS

**13.00-
14.00**

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O24:

EMG Modeling & Processing III - Signal Analysis

Chairs: Daniel Stashuk, University of Waterloo and Aleš Holobar, University of Maribor

SESSION O24.1

Application of a genetic algorithm to establish baseline data for an SEMG noise detection algorithm

12.00

AUTHORS: Yiyang Shi, Shriram Tallam Puranam Raghu, Dawn MacIsaac, Philip Parker

AFFILIATIONS: University of New Brunswick

SESSION O24.2

Numerical Identification of Motor Units using an Optimal Control Approach

12.15

AUTHORS: Tobias Sproll¹, Anton Schiela¹, Madeleine Lowery²

AFFILIATIONS: ¹University Bayreuth, ²University College Dublin

SESSION O24.3

Relationship Between Indwelling Motor Unit Activity And Surface Electromyographic Variables Between 20 And 100 Percent Of Maximal Voluntary Contraction

12.30

AUTHORS: J. Greig Inglis, Justin Parro, David A Gabriel

AFFILIATIONS: Brock University

SESSION O24.4

An algorithm to identify and quantify intermittent (burst-like) muscular patterns of activity in HD-sEMG signals

12.45

AUTHORS: Alejandra Aranceta-Garza¹, Roberto Merletti²

AFFILIATIONS: ¹University of Strathclyde, ²Politecnico Di Torino

13.00-
14.00

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O25:

Wearable Sensors & Accelerometry

Chairs: Jim Potvin, McMaster University and Marco Knaflitz, Politecnico di Torino

12.00	<p>SESSION O25.1 Estimating dynamic loading during walking using low-cost ankle accelerometers in postmenopausal women AUTHORS: Emma Fortune, Stefan Madansingh, Dennis Murphree, Kenton Kaufman AFFILIATIONS: Mayo Clinic</p>
12.15	<p>SESSION O25.2 Quantification of movement performance in the upper extremities of children with obstetrical brachial plexus palsy (OBPP) using accelerometers AUTHORS: Sybele E Williams¹, Ligia Santos Fonseca¹, Jörg Bahm², Catherine Disselhorst-Klug¹ AFFILIATIONS: ¹Institute of Applied Medical Engineering / AME, ²St. Franziskus Hospital</p>
12.30	<p>SESSION O25.3 Comparison of features extracted from data simultaneously recorded using different commercially available wearable accelerometers and a force plate AUTHORS: Emer P Doheny¹, Emma Fortune², Ben O'Callaghan¹, Madeleine Lowery¹ AFFILIATIONS: ¹University College Dublin, ²Mayo Clinic</p>
12.45	<p>SESSION O25.4 A comparative analysis of different sensor fusion algorithms for orientation estimation using magnetic and inertial sensing AUTHORS: Marco Caruso¹, Andrea Cereatti², Marco Knaflitz¹ AFFILIATIONS: ¹Politecnico di Torino, ²Politecnico di Torino; Università di Sassari</p>

13.00-
14.00

COFFEE, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O26:

Knee Biomechanics and Rehabilitation III

Chairs: Peter McNair, Auckland University of Technology and Eamonn Delahunt, University College Dublin

SESSION O26.1

Motor Unit Characteristics of Vastus Medialis Muscle in ACL Reconstructed Knees After Second ACL Tear

12.00 **AUTHORS:** Eduard Kurz¹, René Schwesig¹, Lars Reinhardt¹, Stefan Pröger², Kay Brehme², Martin Pyschik², Stephan Schulze¹, Karl-Stefan Delank¹, Wolfgang Laube², Thomas Bartels²

AFFILIATIONS: ¹Martin-Luther-University, ²Sports Clinic Halle

SESSION O26.2

Hip Muscle Activation In Persons With PFP During The Side-Step Exercise: Is Resistance Important?

12.15 **AUTHORS:** David M Selkowitz¹, George Beneck², Carrie Robinson³, Christopher Powers⁴

AFFILIATIONS: ¹MGH Institute of Health Professions, ²California State University, Long Beach, ³Joint Ventures Physical Therapy and Fitness, ⁴University of Southern California

SESSION O26.3

An Investigation Into The MVIC And Surface EMG Median Frequency Of The Knee Extensor Muscles Measured In T2D Patients And Healthy Sedentary Individuals

12.30 **AUTHORS:** Hugh Byrne¹, Martin O'Reilly¹, Brian Caulfield¹, Chris Thompson², Diarmuid Smith², Margaret Griffin³, Giuseppe De Vito⁴

AFFILIATIONS: ¹Insight Centre at University College Dublin, ²Beaumont Hospital, Dublin, ³Beacon Hospital, Dublin, ⁴University College Dublin

SESSION O26.4

Spatial dependencies of knee vibroarthrograms during knee flexion-extension movement

12.45 **AUTHORS:** Pascal Madeleine, Rasmus Andersen, Lars Arendt-Nielsen

AFFILIATIONS: Aalborg University

**13.00-
14.00**

LUNCH, POSTER SESSION III & EXHIBITION TIME

PARALLEL SESSIONS

SESSION O27:

Movement Disorders

Chairs: Claudio Orizio, University Of Brescia and Rebecca Beck, Trinity College Dublin

15.00 **SESSION O27.1**
Myotonometry in spastic Cerebral Palsy: A pilot study on the effects of isometric contractions on biomechanical muscle parameters of the upper limb
AUTHORS: Andrew J McDaid¹, Lukas Wiedemann¹, Amy Hogan², Sarah Ward¹, Eewei Lim³
AFFILIATIONS: ¹The University of Auckland, ²NZ Cerebral Palsy Society, ³Starship Children's Health

15.15 **SESSION O27.2**
Saccade Behaviour in Cervical Dystonia
AUTHORS: Rebecca B Beck¹, Simone Kneafsey¹, Shruti Narasimham¹, Mariam Al Hussona², Sean O'Riordan², Michael Hutchinson², Richard Reilly¹
AFFILIATIONS: ¹Trinity College Dublin, ²St. Vincent's University Hospital

15.30 **SESSION O27.3**
Monitoring Movement Disorders in Parkinson's Disease
AUTHORS: Serge H Roy¹, Bhawna Shiwani¹, Joshua Kline¹, Maria Saint-Hilaire², Cathi Thomas², Gianluca De Luca¹
AFFILIATIONS: ¹Delsys Inc, ²Boston University Medical Center

15.45 **SESSION O27.4**
Muscle activation in most versus least affected side in patients with Parkinson's disease
AUTHORS: Bente Rona Jensen¹, Anne Sofie Bøgh Malling¹, Meaghan Spedden¹, Bo Morberg¹, Ole Gredal², Per Bech³, Lene Wermuth¹
AFFILIATIONS: ¹OUH/University of Southern Denmark, ²Danish Rehabilitation Center, ³University of Copenhagen

16.00 **SESSION O27.5**
Dynamic Movement in Parkinson's Disease Quantified Using Nonlinear EMG Features
AUTHORS: Matthew W Flood¹, Paul Diamond², Ben O'Callaghan¹, Madeleine Lowery¹
AFFILIATIONS: ¹University College Dublin, ²Royal Hospital Donnybrook

16.15 **SESSION O27.6**
Effect of rhythmic auditory cueing on muscle synergies in people with Parkinson's disease: A pilot study
AUTHORS: Aisha Islam, Cuili Chen, Lynn Rochester, Lisa Alcock, Annette Pantall
AFFILIATIONS: Newcastle University

16.30-17.30 **COFFEE, POSTER SESSION III & EXHIBITION TIME**

17.30-18.00 **AWARD CEREMONY**

14.00-
15.00

KEYNOTE LECTURE 7 INTERNATIONAL SOCIETY OF BIOMECHANICS
 (ISB) SPONSORED LECTURE

Prof. Taija Finni, University of Jyväskylä

Lack of muscular activity as a major health problem

Chair: Karen Søgaard, University of Southern Denmark

PARALLEL SESSIONS

SYMPOSIUM S14

SYMPOSIUM S14:

Moving Beyond the Physical: Addressing Musculoskeletal Injury Induced Neuroplasticity and Motor Control to Improve Patient-function

Chair: Dustin Grooms, Ohio University

15.00

SYMPOSIUM S14.1

Clinically Targeting Neuroplasticity in Rehabilitation

AUTHORS: Alli Gokeler

AFFILIATIONS: University Medical Center Groningen, University of Groningen

15.15

SYMPOSIUM S14.2

Neuroplasticity after Musculoskeletal Injury

AUTHORS: Dustin R Grooms¹, Jochen Baumeister², Jae Yom¹, Alli Gokeler³, Janet Simon¹

AFFILIATIONS: ¹Ohio University, ²Paderborn University, ³University Medical Center Groningen

15.30

SYMPOSIUM S14.3

Patient-Outcomes to ensure Optimized Patient-Function

AUTHORS: Janet E Simon

AFFILIATIONS: Ohio University

15.45

SYMPOSIUM S14.4

Motor Performance changes after Musculoskeletal injury

AUTHORS: Jae Yom

AFFILIATIONS: Ohio University

16.00

SYMPOSIUM S14.5

Translating Neuroplasticity to Motor Performance

AUTHORS: Jochen Baumeister

AFFILIATIONS: Paderborn University

16.30-
17.30

COFFEE, POSTER SESSION III & EXHIBITION TIME

17.30-
18.00

AWARD CEREMONY

PARALLEL SESSIONS

SYMPOSIUM S15:

Neuromechanics of LowerLimb Amputation and Prosthetic Gait

Chairs: Silvia Conforto, Roma Tre University

15.00	SYMPOSIUM S15.1 Muscle synergies of the contralateral lower limb in trans-femoral amputees gait AUTHORS: Cristiano De Marchis, Simone Ranaldi, Silvia Conforto AFFILIATIONS: University Roma TRE
15.15	SYMPOSIUM S15.2 Kinetic and kinematic patterns for prosthetic gait analysis AUTHORS: Silvia Conforto ¹ , Mariano Serrao ² , Tiwana Varrecchia ¹ , Martina Rinaldi ¹ AFFILIATIONS: ¹ University Roma TRE, ² Sapienza University of Rome
15.30	SYMPOSIUM S15.3 Quantitative indexes for assessing lower limb muscle co-activation in amputated subjects AUTHORS: Silvia Conforto ¹ , Alberto Ranavolo ² , Francesco Draicchio ² AFFILIATIONS: ¹ University Roma TRE, ² Italian National Institute for Insurance against Industrial Injuries (INAIL)
15.45	SYMPOSIUM S15.4 Indexes for the Functional Evaluation of Dynamic Stability in Amputees Gait AUTHORS: Simone Ranaldi, Cristiano De Marchis, Michelangelo Guaitolini, Silvia Conforto AFFILIATIONS: University Roma TRE
16.00	SYMPOSIUM S15.5 Neuro-Mechanical Indicators Of Amputees Rehabilitation AUTHORS: Silvia Conforto AFFILIATIONS: University Roma TRE

16.30-17.30 **COFFEE, POSTER SESSION III & EXHIBITION TIME**

17.30-18.00 **AWARD CEREMONY**

PARALLEL SESSIONS

SESSION O28:

Sensors

Chairs: Joshua Kline, Delsys Inc. and Hans Van Dijk, Kempenhaeghe/ University of Ulm

15.00 **SESSION O28.1**
Development And Testing Of Hydrogel-Based EMG Electrodes Transparent To Ultrasounds
AUTHORS: Alberto Botter¹, Marialaura Beltrandi², Matteo Mistretta², Marco Gazzoni¹, Taian Vieira¹
AFFILIATIONS: ¹Politecnico di Torino - LISiN, ²SPES Medica srl

15.15 **SESSION O28.2**
Design and validation of a modular and wearable High-Density sEMG acquisition system
AUTHORS: Giacinto Luigi Cerone, Alberto Botter, Marco Gazzoni
AFFILIATIONS: Politecnico di Torino

15.30 **SESSION O28.3**
3D Printing and Subsequent Evaluation of Novel Microneedle Electrodes for Surface Electromyography
AUTHORS: Kevin J Krieger, Nicky Bertollo, Madeleine Lowery, Eoin D O'Cearbhaill
AFFILIATIONS: University College Dublin

15.45 **SESSION O28.4**
High-Density Electrodes For Intramuscular Electromyographic Recordings
AUTHORS: Silvia Muceli¹, Wigand Poppendieck², Klaus-Peter Hoffmann², Ken Yoshida³, David Liebetanz⁴, Dario Farina¹
AFFILIATIONS: ¹Imperial College London, ²Fraunhofer Institute for Biomedical Engineering, ³Indiana University-Purdue University Indianapolis, ⁴University Medical Center Göttingen

16.00 **SESSION O28.5**
Single-needle multiscanning-EMG
AUTHORS: Javier Navallas, Adrian Eciolaza, Oliver Rubio, Iñigo Corera, Javier Rodriguez, Armando Malanda
AFFILIATIONS: Public University of Navarra

16.15 **SESSION O28.6**
Experimental setup for objective evaluation of ultrasound speckle tracking in the human uterus
AUTHORS: Federica Sammali¹, Celine Blank², Lin Xu¹, Yizhou Huang¹, Nienke Petronella Maria Kuijsters², Benedictus Christiaan Schoot², Massimo Mischi¹
AFFILIATIONS: ¹Eindhoven University of Technology, ²Catharina Hospital

16.30-17.30 **COFFEE, POSTER SESSION III & EXHIBITION TIME**

17.30-18.00 **AWARD CEREMONY**

PARALLEL SESSIONS

SESSION: O29 Back, Neck & Shoulder Pain III - Shoulder & Neck

Chairs: Paul Hodges, University of Queensland and Jan Celichowski, University of Poznan

15.00	<p>SESSION O29.1 Fatigue-induced changes in cervical extensors muscles on sensorimotor performance: manifestations in subclinical neck pain group AUTHORS: Sharon MH Tsang, Chi-Wun Au, Cherry Chan, Kimmy Chow, Alvin Luk, Alvin Wong, Jay Dai, Grace Szeto AFFILIATIONS: The Hong Kong Polytechnic University</p>
15.15	<p>SESSION O29.2 Reorganisation Of The Motor Cortex In Individuals With Neck Pain AUTHORS: Edith Elgueta Cancino^{1, 2}, Welber Marinovic², Gwendolen Jull¹, Paul Hodges¹ AFFILIATIONS: ¹University of Queensland, ²Curtin University</p>
15.30	<p>SESSION O29.3 Muscle stiffness is objectively not increased in chronic neck pain AUTHORS: Angela V Dieterich¹, Utku Yavuz¹, Antoine Nordez², Deborah Falla³, Frank Petzke¹ AFFILIATIONS: ¹University Medical Center Goettingen, ²Université de Nantes, ³University of Birmingham</p>
15.45	<p>SESSION O29.4 The consistency in locating nociceptive stimuli applied to the lumbar region AUTHORS: Marco Barbero¹, Davide Trenta², Alberto Gallace³, Deborah Falla⁴, Corrado Cescon¹, Davide Corbetta⁵ AFFILIATIONS: ¹University of Applied Sciences and Arts of Southern Switzerland, ²Bachelor's Degree in Physiotherapy, Vita-Salute San Raffaele University, Milan, Italy, ³Department of Psychology, University of Milano-Bicocca, Italy. Milan Center for Neuroscience, Milan,, ⁴Centre of Precision Rehabilitation for Spinal Pain (CPR Spine), School of Sport, Exercise and Rehabi, ⁵Laboratory of Analysis and Rehabilitation of Motor Function, San Raffaele Scientific Institute, Mila</p>
16.00	<p>SESSION O29.5 The initial effects on shoulder muscle activity of shoulder mobilization with movement during shoulder abduction: a repeated-measures study on patients with pain-limited shoulder elevation AUTHORS: Daniel Cury Ribeiro¹, Gisela Sole¹, Jonathan Shemmell¹, Bill Vicenzino² AFFILIATIONS: ¹University of Otago, ²The University of Queensland</p>
16.15	<p>SESSION O29.6 Is grip strength a reliable indicator of recovery following upper limb fatigue? AUTHORS: Omid Khaiyat¹, David Hawkes², Michael Grant¹, Jessica McMahon¹, Ian Horsley³ AFFILIATIONS: ¹Liverpool Hope University, ²University of Liverpool, ³English Institute of Sport</p>

16.30-
17.30

COFFEE, POSTER SESSION III & EXHIBITION TIME

17.30-
18.00

AWARD CEREMONY