



# ESMAC 2024

9–14 September 2024  
Oslo, Norway

Programme  
Book

[www.esmac2024.org](http://www.esmac2024.org)

# Acknowledgements

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**KISTLER**

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Bronze Partner



Supporters



BTS Bioengineering



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# Welcome Word

## “People in motion – where clinical care meets technology”

Dear Colleagues and Friends,

On behalf of the Organising Committee of the Annual Meeting of the European Society for Movement Analysis in Adults and Children (ESMAC), it is a pleasure to welcome you to the ESMAC 2024 Annual Meeting in Oslo, Norway.

An exciting scientific programme has been created, including inspiring keynote lectures and many oral and poster presentations. During the conference, the keynote speakers Prof. Reidun Jahnsen and Ass. Prof. Jason Wilken will share their clinical and technical knowledge, while the lecture of Prof. Tron Krosshaug focuses on sports injury prevention, with a focus on biomechanical analysis of serious knee injuries. The honoured Baumann lecture, in memory of Prof. Baumann, will be presented by Mr Andrew Roberts.

During the three-day Gait Course, a multidisciplinary international team of experts in gait analysis will guide the attendees through the techniques and interpretation of gait analysis for research and clinical practice. The Gait Course, same as our four pre-conference Seminars will be hosted at the Oslo Metropolitan University, a vibrant university campus centrally located in Oslo. For the main conference we will continue at the Oslo Conference Centre to benefit from their extensive experience, and modern facilities.

The Welcome Cocktail will be hosted by the Oslo City Council in the Oslo City Hall, which is also the location for the Nobel Peace Prize ceremony each year. Lastly, it is a privilege to invite you to run with us to support the FUNKIS Snowboard Club, a charity that supports and motivates children with disabilities to participate in winter sport activities.

We also invite you to explore the Oslo nightlife with a variety of restaurants and bars, and the lovely harbour area looking out over the Oslo fjord. We hope that many scientists, physicians, physical therapists, and biomedical engineers have been able to join ESMAC 2024 as a multidisciplinary audience to exchange knowledge, ideas and friendship in the ESMAC community. We look forward to welcoming you to this beautiful city.



**Linda Rennie**  
Local Organizing Committee Chair



**Thomas Dreher**  
Scientific Chair

# Venue

## Venue Gait Course & Seminars

### OsloMet – Oslo Metropolitan University

Campus Pilestredet  
Pilestredet 46, 0167 Oslo

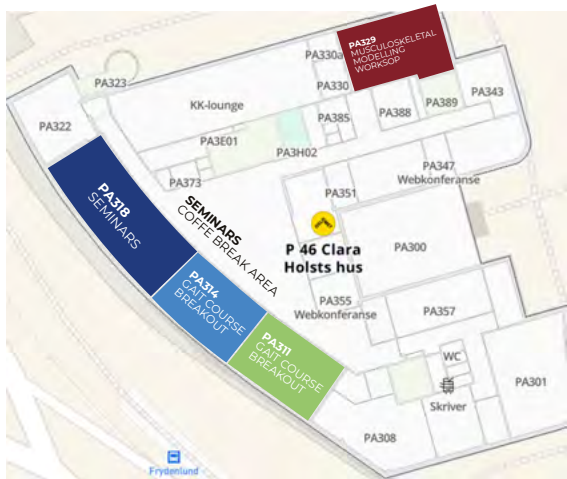
#### OsloMet

Ground Floor  
(1<sup>st</sup> Floor)



- **ATHENE 1**  
GAIT COURSE
- **ATHENE 2**  
GAIT COURSE BREAKOUT
- **REGISTRATION**  
GAIT COURSE & SEMINARS

**Oslomet**  
3<sup>rd</sup> Floor



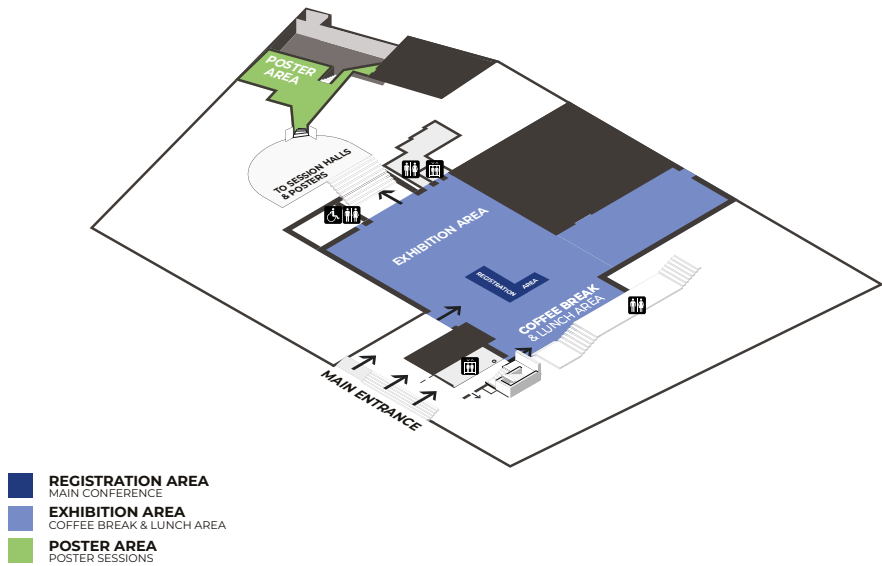
- PA318**  
SEMINARS
- PA314**  
GAIT COURSE BREAKOUT
- PA311**  
GAIT COURSE BREAKOUT
- PA329**  
MUSCULOSKELETAL MODELLING WORKSHOP

# Venue Main Conference

Oslo Congress Centre  
Oslo Kongressenter Folkets Hus AS  
Youngs gate 21, 0181 Oslo

## Floorplan Oslo Congress Centre

Ground Floor  
1<sup>st</sup> Floor





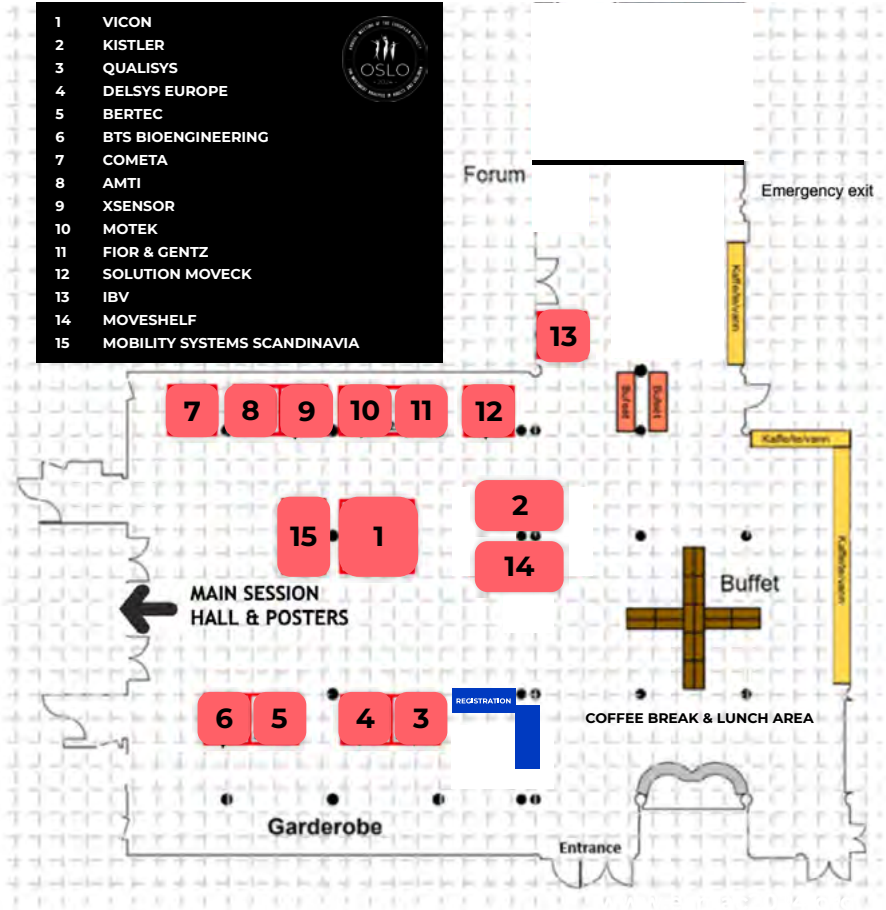
**Floorplan Oslo  
Congress Centre**  
2<sup>nd</sup> Floor



- HALL A**  
PLENARY ROOM
- HALL B**  
PARALLEL ROOM
- HALL C**  
PARALLEL ROOM

For floorplans and maps please see [Venue](#) on the website.

# Exhibition



# Practical Information

## Venue Gait Course & Seminars

OsloMet – Oslo Metropolitan University  
Campus Pilestredet  
Pilestredet 46, 0167 Oslo  
[Map](#)

## Venue Main Conference

Oslo Congress Centre  
Oslo Kongressenter Folkets Hus AS  
Youngs gate 21, 0181 Oslo  
<https://www.oslokongressenter.no/en/>

## Arrival from the Airport

Flytoget Airport Express Train departs from Oslo Central Station and Oslo Airport every 10 minutes during the day and every 20 minutes early in the morning and late at night, on weekends and during school holidays. The journey takes about 20 minutes. For prices and departure times please [check the website](#).

## Registration Opening Hours:

### Gait Course & Seminars – OsloMet Foyer, Ground floor

Monday 9 September	07:30–17:00
Tuesday 10 September	07:30–17:00
Wednesday 11 September	07:30–17:00

### Main Conference – Oslo Congress Centre Foyer, Ground floor

Thursday 12 September	07:00–18:30
Friday 13 September	08:00–17:00
Saturday 14 September	08:00–14:00

Please make sure to present the Registration QR Code at the onsite desk to ease the registration process.

## Exhibition Opening Hours:

### Oslo Congress Centre Foyer, Ground floor

Thursday 12 September	08:00–17:45
Friday 13 September	08:30–17:00
Saturday 14 September	08:30–13:00

## Abstract Book

Abstracts are available online in the Gait & Posture, will be linked from event website.

## Badges

Name badge shall always be worn when attending the sessions and official programme.

## Certificate of Attendance

Attending participants can download their Certificate of Attendance in the Online Registration portal within one week after the event.

## Conference Application

Will be available during the event dates for registered participants. Scan the QR Code on the back of your badge to download the App.

## Emergency

In case of emergency, please call:

Fire or accidents	Tel. 110
Police – immediate assistance	Tel. 112
Ambulance and Medical assistance	Tel. 113

Or please refer to the Organizing team to ask for assistance.

## Evaluation Form

The Evaluation form (Survey) will be available online after the event.

## Food and Beverages

Coffee breaks and lunches are included in the registration fee and will be served in the OsloMet Foyer, ground floor (Gait Course), on the OsloMet 3<sup>rd</sup> floor (coffee breaks Seminars) and in the Congress Centre Foyer, ground floor (Main Conference).

## Insurance and Liability

The Organisers will accept no liability for personal injuries sustained or for loss or damage to property belongings of Meeting participants, accompanying persons either during or because of the Meeting or during the accompanying programme. Participants are recommended to seek insurance coverage for health and accident, lost luggage, and trip cancellation.

## Internet

Wi-Fi is available in both the venues for all delegates.

## Language of the Meeting

The official language of the ESMAC Annual Meeting is English. All lectures will be delivered in English and no interpretation is provided.

## Lost & Found

A lost and found service is available at the Registration Desk in the ESMAC Meeting area.

## Photos

Please do not take photos of the presentations.

## Posters

Poster area is in the Hall D, Oslo Congress Centre Mezzanine.

For poster mounting see the [Poster Guidelines](#). The posters are divided into two groups. Your poster will be visible for **one day** only. Based on your group, you should mount it either on Thursday or Friday.

## Presentations

- 1) Recommended option is to upload your presentation via the online platform in advance.

### **UPLOAD HERE**

### **Upload Deadline: 10 September 2024**

Your uploaded presentation will be prepared in your lecture room.

- 2) Hand over your presentation to the personnel in your lecture room on a USB stick as soon as possible, but not later than **10 minutes BEFORE the start of your session**. If there is no break before your session, please upload your presentation during the last break before your session. Presentations for an early morning session should be handed over the evening before.

**Please note that it is not possible to present from your laptop in the lecture room.**

See the full [Oral Presentations Guidelines](#).

## Contact Details

ESMAC Meeting Secretariat

ESMAC 2024 **Hotline: +420 727 803 223**

(available during 9–14 September 2024)

Registration: [registration@esmac.org](mailto:registration@esmac.org)

Abstracts: [abstracts@esmac.org](mailto:abstracts@esmac.org)

ESMAC Secretariat: [info@esmac.org](mailto:info@esmac.org)



## Disclaimer

The Meeting Organisers have taken all reasonable care in deciding for the Meeting. In the event of unforeseen disruptions, neither the organisers nor their agents can be held responsible for any losses or damages incurred by delegates. The programme is correct at the time of final preparations, but organisers reserve the right to alter the programme when deemed necessary. The Meeting Organisers act as agents only in securing hotels, transport, and travel services, and shall

in no event be liable for acts or commissions in the event of injury, damage, loss, accident delay or irregularity of any kind whatsoever during arrangements organised through contractors or by the employees of such contractors. Hotel and transportation services are subject to the terms and conditions under which they are offered to the public. Delegates should make their own arrangements with respect to personal insurance. The Meeting Organisers reserve the right to make changes as and when deemed necessary, without prior notice to the parties concerned. All disputes are subject to resolution under Czech Law.

## Programme Changes

The Meeting Organisers cannot assume liability for any changes in the programme due to the external or unforeseen circumstances.

## Data Privacy and Security

For our Privacy Policy please refer to website: <https://www.czech-in.org/C-IN/GDPR/privacy-policy.html>

# Programme at a Glance

Time	Monday	Tuesday			Wednesday			Time
	9 September	10 September		11 September				
	ATHENE 1	ATHENE 1	PA318	ATHENE 1	PA318	PA329		
7:00							7:00	
8:00	Registration			Gait Course			8:00	
8:15		Gait Course					8:15	
8:30	Gait Course		Pre-Conference Seminar 1		Pre-Conference Seminar 3		8:30	
8:45			Python programming for the movement sciences		Systematic interpretation of clinical gait analysis in children with CP		8:45	
9:00						Musculoskeletal Modelling Workshop	9:00	
9:15							9:15	
9:30				Coffee Break			9:30	
9:45				Gait Course			9:45	
10:00		Coffee Break					10:00	
10:15	Coffee Break	Gait Course					10:15	
10:30	Gait Course		Coffee Break		Coffee Break		10:30	
10:45							10:45	
11:00			Pre-Conference Seminar 1		Pre-Conference Seminar 3		11:00	
11:15			Python programming for the movement sciences		Systematic interpretation of clinical gait analysis in children with CP		11:15	
11:30						11:30		
11:45						11:45		
12:00	Lunch Break		Break	Lunch Break	Break	12:00		
12:15		Lunch Break				12:15		
12:30						12:30		
12:45	Gait Course			Gait Course		12:45		
13:00		Gait Course				13:00		
13:15			Pre-Conference Seminar 2		Pre-Conference Seminar 4	13:15		
13:30			Lower limb orthoses and influence on gait and motion in children and adults		Machine Learning for Clinical Gait Analysis	13:30		
13:45						13:45		
14:00				Coffee Break		14:00		
14:15						14:15		
14:30	Coffee Break	Coffee Break		Gait Course	Coffee Break	14:30		
14:45	Gait Course	Gait Course				14:45		
15:00			Coffee Break			15:00		
15:15						15:15		
15:30			Pre-Conference Seminar 2		Pre-Conference Seminar 4	15:30		
15:45			Lower limb orthoses and influence on gait and motion in children and adults		Machine Learning for Clinical Gait Analysis	15:45		
16:00						16:00		
16:15	Break					16:15		
16:30	Gait Course	Break				16:30		
16:35		Gait Course				16:35		
16:45						16:45		
17:00						17:00		
17:30						17:30		
17:45						17:45		
18:00				ESMAC 2024 Welcome Cocktail Oslo Town Hall			18:00	
18:15						18:15		
18:30						18:30		
18:45						18:45		
19:00						19:00		
19:15						19:15		
19:30				Early Career Network (ECN) Opening Ceremony Gamle-Raadhus-Scene			19:30	
19:45						19:45		
20:00						20:00		
20:15						20:15		
20:30						20:30		
20:45						20:45		
21:00						21:00		
21:30						21:30		
22:00						22:00		

Time	Thursday 12 September			Friday 13 September		Saturday 14 September		Time
	HALL A	HALL B	HALL C	HALL A	HALL B	HALL A	MEETING ROOM 1	
7:00								7:00
8:00				Charity Run				8:00
8:15	Opening & Awards Session							8:15
8:30	Baumann Lecture Andrew Roberts			9) Foot and Ankle		15) Modern methodology - Multiplanar analysis		8:30
8:45	1) Hot topics in CP and muscle tone							8:45
9:00								9:00
9:15						17) Muscle tissue properties and development	16) Clinical Case Studies	9:15
9:30				Industry Presentation				9:30
9:45	Sponsors' Pitches			Coffee Break				9:45
10:00	Coffee Break			Keynote Lecture 2 Tron Krosshaug		Coffee Break		10:00
10:15	2) Machine learning and AI in motion analysis			Industry Presentation		18) Paediatric neurological disorders and syndromes		10:15
10:30	Coffee Break			10) Sports & sports injuries				10:30
10:45								10:45
11:00	Industry Presentation			Poster Panic Session Lunch & Posters I.		Keynote Lecture 3 Reidun Jansen		11:00
11:15	Poster Panic Session							11:15
11:30	Lunch & Posters I.			Poster Panic Session Lunch & Posters II.		Awards & Closing ceremony		11:30
11:45	Keynote Lecture 1 Jason Wilken							11:45
12:00	3) Prosthetics & orthotics			4) Modelling and simulation		5) Stability and fall risk		12:00
12:15	6) Spinal cord injury and rehabilitation			7) Adult neurological disorders and orthopaedics		8) Markerless Motion Capture		12:15
12:30	Coffee Break			11) Movement analysis methodology 1 - Enhanced methods and harmonising gait data		12) Spine & Trunk - Cervical spine and adults		12:30
12:45	Coffee Break			13) Movement analysis methodology 2 - Advances in clinical application		14) Spine & Trunk - Scoliosis and upper extremity		12:45
13:00	Coffee Break							13:00
13:15	Coffee Break							13:15
13:30	Coffee Break							13:30
13:45	Coffee Break							13:45
14:00	Coffee Break							14:00
14:15	Coffee Break							14:15
14:30	Coffee Break							14:30
14:45	Coffee Break							14:45
15:00	Coffee Break							15:00
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15:30	Coffee Break							15:30
15:45	Coffee Break							15:45
16:00	Coffee Break							16:00
16:15	Coffee Break							16:15
16:30	Coffee Break							16:30
16:35	Coffee Break							16:35
16:45	Coffee Break							16:45
17:00	Coffee Break							17:00
17:30	Coffee Break							17:30
17:45	ESMAC Annual General Assembly							17:45
18:00	ESMAC Annual General Assembly							18:00
18:15	ESMAC Annual General Assembly							18:15
18:30	ESMAC Annual General Assembly							18:30
18:45	ESMAC Annual General Assembly							18:45
19:00	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				19:00
19:15	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				19:15
19:30	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				19:30
19:45	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				19:45
20:00	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				20:00
20:15	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				20:15
20:30	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				20:30
20:45	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				20:45
21:00	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				21:00
21:30	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				21:30
22:00	Vicon User Group Social Roor Restaurant			ESMAC Gala Dinner Grefsenkollen				22:00

# Gait Course

9 – 11 September 2024

**The ESMAC Gait Course will be held in OsloMet – Oslo Metropolitan University**

ESMAC Gait Course in Oslo is a three-day course meant for beginners and people who like to refresh their knowledge in clinical gait analysis. We dive into an introduction to gait analysis, normal gait vs. pathological gait, case examples, and principles of data interpretation while having both theoretical and practical sessions. We regularly adapt the course content according to new developments and incorporate feedback from former students to keep the course attractive and alive.

The first day highlights requirements and development of healthy walking, motion analysis from 2D to 3D as well as marker placement. On the second day, more detailed aspects of gait analysis (kinematics, kinetics, EMG, quality insurance) are covered in theoretical courses as well as in practical sessions. The third and final day includes methods of integrating and communicating clinical gait analysis data as well as discussing case examples in small groups. The different sessions are led by experienced gait analysts with different clinical and technical backgrounds.

[See the Gait Course Programme](#)

<https://www.esmac2024.org/gait-course/>

[See the ESMAC Teaching Faculty](#)

<https://esmac.org/gait-course/teachers/>



**Dr. Ursula Trinler**

ESMAC Gait Course Organizer



# Pre-Conference Seminars

The pre-conference Seminars will be held in OsloMet – Oslo Metropolitan University

## Tuesday 10 September

- 08:30–12:15 Python programming for the movement sciences (S1)  
13:15–17:00 Lower limb orthoses and influence on gait and motion in children and adults (S2)

## Wednesday 11 September

- 08:30–12:15 Systematic interpretation of clinical gait analysis in children with CP (S3)  
13:15–17:00 Machine Learning for Clinical Gait Analysis (S4)

### Tuesday 10 September at 08:30–12:15

#### **Python programming for the movement sciences (S1)**

Philippe C. Dixon, McGill University, Canada

Clint Hansen, the University Medical Centre, Kiel, Germany

Robbin Romijnders, Universitätsklinikum Schleswig-Holstein, Kiel

Jill Emmerzaal, McGill University, Canada

### Tuesday 10 September at 13:15–17:00

#### **Lower limb orthoses and influence on gait and motion in children and adults (S2)**

Ingrid Skaaret, Oslo Metropolitan University, Oslo University Hospital and Sophies Minde Ortopedi

Åsa Bartonek, Karolinska Institutet, Sweden

Marie Eriksson, Karolinska Institutet, Sweden

**Wednesday 11 September at 08:30–12:15**

**Systematic interpretation of clinical gait analysis data in children with cerebral palsy (S3)**

Sarah Dekker, Reade Centre for Rehabilitation and Rheumatology, Netherlands

Koen Wishaupt, Amsterdam UMC, Netherlands

Marjolein van der Krogt, Laboratory of Clinical Movement Analysis of Amsterdam UMC, the Netherlands.

Han Houdijk, Center for Human Movement Sciences, University Medical Center Groningen, the Netherlands.

Annemieke Buizer, Department of Rehabilitation Medicine of Amsterdam UMC, the Netherlands.

**Wednesday 11 September at 13:15–17:00**

**Machine Learning for Clinical Gait Analysis: a quick start guide for newcomers (S4)**

Brian Horsak, St. Pölten University of Applied Sciences, Austria

Djordje Slijepčević, St. Pölten University of Applied Science, Austria

For more information about the Seminars presenters see <https://www.esmac2024.org/pre-conference-seminars/>

**Musculoskeletal Modelling Workshop**

*The workshop will be held in OsloMet – Oslo Metropolitan University*

**Wednesday 11 September at 9:00–17:00**

Hans Kainz and Willi Koller from the University of Vienna, with Bram Van Den Bosch from KU Leuven and Tom Buurke from the University Medical Center Groningen and KU Leuven.



# Baumann Lecture



## Andrew Roberts

Andrew Roberts is a children's orthopaedic surgeon who acts as the medical director of Oswestry's gait laboratory. Only by getting involved with the process of gait analysis can a clinician get the best out of this technology so he spends a good deal of his time examining patients and interpreting the data.

# Keynote Speakers



## Jason M. Wilken

Jason Wilken PT, PhD is an Associate Professor and Director of Collaborative Research and Development in the Department of Physical Therapy and Rehabilitation Science at the University of Iowa. He also serves as the Director of the Human Performance and Clinical Outcomes laboratory. Prior to joining the University of Iowa, he was the founding Director of the Military Performance Laboratory at the Center for the Intrepid at Brooke Army Medical Center and Senior Scientist for the Extremity Trauma and Amputation Center of Excellence. His patient centric research is focused on maximizing function after lower limb injury or disease. His efforts include the development and evaluation of advanced prosthetic and orthotic technologies, virtual reality-based interventions, clinically relevant outcomes assessment, and development of novel approaches to enhance walking stability.

## Keynote Speakers



### Tron Krosshaug

**Tron Krosshaug, PhD is a professor at the Oslo Sports Trauma Research Center and the Department of Sports Medicine at the Norwegian School of Sport Sciences. His main research area is sports injury prevention, with a primary focus on biomechanical analysis of serious knee injuries in various sports. In his PhD work he developed a new method for extracting 3D joint kinematics from videos of real injury situations. The method has later been used by researchers world-wide to investigate e.g. ankle sprains and head impacts in various sports.**

Moreover, Krosshaug has utilized 3D movement analysis in experimental biomechanical studies as well as in prospective cohort studies, to increase our understanding of ACL injury etiology. Krosshaug is also an entrepreneur with his company Muscle Animations where the aim is to be world leading in 3D visualization and dissemination of evidence-based knowledge about strength training biomechanics, exercise technique and muscle-skeletal loading.

## Keynote Speakers



### Reidun Birgitta Jahnsen

In addition to being professor emerita at the Institute of Health and Society, Department for Public Health Science and Epidemiology, University of Oslo, Reidun Birgitta Jahnsen holds the following positions: Senior researcher in the Norwegian Quality and Surveillance Registry for Cerebral Palsy (NorCP) at the Department of Pediatric and Adolescent Medicine, Oslo University Hospital [www.norcp/siv.no](http://www.norcp/siv.no) and a Senior researcher at Beitostølen Healthsports Centre <https://www.bhss.no/>

Her background is more than 20 years of clinical physiotherapy work, and even longer of research. Since 1997, her main position has been at Oslo University Hospital (OUH), from 2006 in NorCP. This position has included both clinical work in the Motion Laboratory and research, and from 2010 only research, shared between OUH and Beitostølen Healthsports Centre (BHC), a publicly funded rehabilitation centre in the Norwegian mountains. BHC is a world leader in the field of combining adapted physical activity with rehabilitation medicine, and collaboration with NTNU in Trondheim allows us to do 3D motion analysis out in the field.

# Social Events



## Welcome Cocktail

**Wednesday, 11 September 2024 at 18:00–19:30**  
**Oslo City Hall**

Included in the registration fee for the Main Conference.  
Hosted by the Oslo City Council.

## Early Career Network (ECN)

**Wednesday, 11 September  
2024 at 19:30–21:30**  
**Gamle-Raadhus-Scene,  
Christiania Torv 1, Oslo**

Dedicated to Ph.D. students as well  
as to researchers and clinicians in a later  
stage of their early career.





## ESMAC Charity Run

**Friday, 13 September  
2024 at 07:00–08:00**

**Oslo Centre and Harbour**

Tickets at 25 EUR

ESMAC 2024 Charity Run will support the FUNKIS Snowboard Club, a charity that supports and motivates children with disabilities to participate in winter sport activities.



## Gala Dinner

**Friday, 13 September  
2024 at 19:00–23:00**

**Grefsenkollen  
Restaurant**

[www.grefsenkollen.no](http://www.grefsenkollen.no)

**FULLY BOOKED**

# Detailed Programme

Thursday, 12 September 2024

## Opening & Awards Session

08:15–08:30, Hall A

## Baumann Lecture: Andrew Roberts

08:30–09:00, Hall A

Chair: Ayman Assi (Lebanon)

Andrew Roberts<sup>1</sup>

<sup>1</sup> RJAH Orthopaedic Hospital, Oswestry, United Kingdom

## Plenary Session:

### 1) Hot topics in CP and muscle tone

09:00–10:15, Hall A

Chairs: Andrew Roberts (United Kingdom), Marjolein van der Krogt (Netherlands)

#### O 001 One muscle to explain them all? Heterogeneity of muscle size in ambulant children with spastic cerebral palsy

*Britta Hanssen<sup>1,2</sup>, Nicky Peeters<sup>1</sup>, Tijl Dewit<sup>1,3</sup>, Catherine Huenaerts<sup>3</sup>, Nathalie De Beukelaer<sup>1,4</sup>, Anja Van Campenhout<sup>5,6</sup>, Kaat Desloovere<sup>1,3</sup>*

<sup>1</sup> KU Leuven, Department of Rehabilitation Sciences, Leuven, Belgium

<sup>2</sup> University Hospitals Leuven, Department of Physical Rehabilitation Medicine, Leuven, Belgium

<sup>3</sup> University Hospitals Leuven, Clinical Motion Analysis Laboratory, Pellenberg, Belgium

<sup>4</sup> University of Geneva, Department of Surgery, Geneva, Switzerland

<sup>5</sup> University Hospitals Leuven, Department of Orthopedics, Leuven, Belgium

<sup>6</sup> KU Leuven, Department of Development and Regeneration, Leuven, Belgium

#### O 002 ☆ Triceps surae muscle-tendon length changes and shear modulus ratios across the ankle motion in adolescents with cerebral palsy

*Francesco Cenni<sup>1</sup>, Nathalie Alexander<sup>2</sup>, Maria Sukanen<sup>3</sup>, Alejandro Hernandez Belmonte<sup>4</sup>, Iida Laatikainen-Raussi<sup>3</sup>, Simon-Henri Schless<sup>5</sup>, Harri Piitulainen<sup>3</sup>, Taija Finni<sup>3</sup>*

<sup>1</sup> University of Brescia, Department of Clinical and Experimental Sciences, Brescia, Italy

<sup>2</sup> Children's Hospital of Eastern Switzerland, Laboratory for Motion Analysis, St. Gallen, Switzerland

<sup>3</sup> University of Jyväskylä, Faculty of Sport and Health Sciences, Jyväskylä, Finland

<sup>4</sup> University of Murcia, Human Performance and Sports Science Laboratory, Faculty of Sport Sciences, Murcia, Spain

<sup>5</sup> ALYN Hospital, Motion analysis laboratory Helmsley P/ARC, Jerusalem, Israel

**O 003 ☆ On the clinical interpretation of overground gait stability indices in children with cerebral palsy**

*Morgan Sangeux<sup>1</sup>, Elke Viehweger<sup>1</sup>, Jacqueline Romkes<sup>1</sup>, Katrin Bracht-Schweizer<sup>1</sup>*

<sup>1</sup> UKBB, Centre for Clinical movement analysis, Basel, Switzerland

**O 004 Walking energy expenditure is more sensitive to bodyweight support in children with cerebral palsy than in their typically developing peers**

*Andrew Ries<sup>1</sup>, Katherine M. Steele<sup>2</sup>, J Maxwell Donelan<sup>3</sup>, Michael H. Schwartz<sup>1</sup>*

<sup>1</sup> Gillette Children's Specialty Healthcare, Center for Gait and Motion Analysis, St Paul, USA

<sup>2</sup> University of Washington, Mechanical Engineering, Seattle, USA

<sup>3</sup> Simon Fraser University, Biomedical Physiology and Kinesiology, Burnaby, Canada

**O 005 Selective dorsal rhizotomy reduces stretch hyperreflexia and possibly muscle tone in children with spastic cerebral palsy**

*Jente Willaert<sup>1</sup>, Catherine Huenaerts<sup>2</sup>, Lena H. Ting<sup>3</sup>, Kaat Desloovere<sup>4</sup>, Anja Van Campenbouts<sup>5</sup>, Friedl De Groot<sup>1</sup>*

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<sup>5</sup> KU Leuven / UZ Leuven, Department of Development and Regeneration, Leuven, Belgium

**O 006 ☆ Is the measure of variability a suitable biomarker to quantify dystonia during gait in individuals with mixed tone cerebral palsy?**

*Gilad Sorek<sup>1</sup>, Marije Goudriaan<sup>2</sup>, Itai Schurr<sup>3</sup>, Simon-Henri Schless<sup>1,3</sup>*

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<sup>2</sup> Utrecht University, Corporate Offices - Student & Academic Affairs Office - Education- Education Policy, Utrecht, Netherlands

<sup>3</sup> ALYN Pediatric and Adolescent Rehabilitation Hospital, Motion analysis and biofeedback laboratory, Jerusalem, Israel

**O 007 Worsening Gait deviations are possible in Hereditary Spastic Paraparesis**

*Lane Wimberly<sup>1</sup>, Cinthya Meza<sup>2</sup>, Kelly Jeans<sup>3</sup>, Linsley Smith<sup>4</sup>, Michelle Christie<sup>4</sup>, Fabiola Reyes<sup>5</sup>, Elizabeth Bunkell<sup>5</sup>*

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## Sponsors' Pitches

10:15–10:30, Hall A

## Coffee Break

10:30–11:00

## Plenary Session:

### 2) Machine learning and AI in motion analysis

11:00–12:15, Hall A

Chairs: Morgan Sangeux (Switzerland), Kaat Desloovere (Belgium)

#### **O 008 Exploring the potential of AI diffusion models for synthesizing diverse gait patterns**

*Eirik Gromholt Homlong<sup>1</sup>, Hemin Ali Qadir<sup>1</sup>, Rabul Prasanna Kumar<sup>1</sup>, Ole Jacob Elle<sup>1</sup>, Ola Wiig<sup>2</sup>*

<sup>1</sup> Oslo University Hospital, Intervention Centre, Oslo, Norway

<sup>2</sup> Oslo University Hospital, Orthopaedic Department, Oslo, Norway

#### **O 009 Explainable artificial intelligence for walking speed classification from vertical ground reaction forces**

*Fabian Horst<sup>1,2</sup>, Djordje Slijepcevic<sup>2,3</sup>, Wolfgang Immanuel Schöllborn<sup>1</sup>, Brian Horsak<sup>4,5</sup>, Matthias Zeppelzauer<sup>3</sup>*

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<sup>5</sup> St. Pölten University of Applied Sciences, Institute of Health Sciences, St. Pölten, Austria

#### **O 010 Predicting ground reaction forces in overground walking from gait kinematics using machine learning**

*Djordje Slijepcevic<sup>1</sup>, Philipp Krondorfer<sup>2,3</sup>, Fabian Unglaube<sup>4</sup>, Andreas Kranz<sup>1</sup>, Matthias Zeppelzauer<sup>1</sup>, Brian Horsak<sup>2,3</sup>*

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<sup>4</sup> Orthopaedic Hospital Vienna-Speising, Laboratory of Gait and Movement Analysis, Vienna, Austria

#### **O 011 Machine learning models to help predict treatment decisions in clinical gait analysis**

*Michael Schwartz<sup>1</sup>, Andrew Ries<sup>1</sup>, Andrew Georgiadis<sup>1</sup>*

<sup>1</sup> Gillette Children's Specialty Healthcare, Center for Gait and Motion Analysis, St. Paul, USA

#### **O 012 ☆ Machine learning models to help predict treatment outcomes in clinical gait analysis**

*Michael Schwartz<sup>1</sup>, Andrew Ries<sup>1</sup>, Andrew Georgiadis<sup>1</sup>*

<sup>1</sup> Gillette Children's Specialty Healthcare, Center for Gait and Motion Analysis, St. Paul, USA

**O 013 Activity recognition in children with CP: Development and validation of a human activity recognition model**

*Marte Fosslaten Tørring<sup>1</sup>, Aleksej Logacjov<sup>2</sup>, Siri Merete Brændvik<sup>1</sup>, Astrid Ustad<sup>1</sup>, Karin Roeleveld<sup>1</sup>, Ellen Marie Bardal<sup>1</sup>*

<sup>1</sup> Norwegian University of Science and Technology, Neuromedicine and Movement Science, Trondheim, Norway

<sup>2</sup> Norwegian University of Science and Technology, Computer Science, Trondheim, Norway

**O 014 Accelerating prosthetics: A machine learning approach to identifying locomotor activities with shank-mounted accelerometers**

*Liam Hughes<sup>1</sup>, Martin Bencsik<sup>2</sup>, Maria Bisele<sup>3</sup>, Cleveland Barnett<sup>2</sup>*

<sup>1</sup> University Hospital Coventry and Warwickshire, Gait Lab, Coventry, United Kingdom

<sup>2</sup> Nottingham Trent University, Science and Technology, Nottingham, United Kingdom

<sup>3</sup> Heidelberg University Hospital, Orthopedic Department, Heidelberg, Germany

**Vicon Industry Presentation**

*12:15–12:30, Hall A*

**Poster Panic Session I.**

*12:30–13:00, Hall A*

**Lunch & Posters I.**

*13:00–14:00*

**Keynote Lecture 1:**

**Jason Wilken**

*14:00–14:45, Hall A*

*Chair: Thomas Dreher (Switzerland)*

**Where are the disagreements? From clinical opinion to scientific evidence**

*Jason Wilken<sup>1</sup>*

<sup>1</sup> University of Iowa, Department of Physical Therapy and Rehabilitation Science, USA

## Parallel Session:

### 3) Prosthetics & Orthotics

14:45–16:15, Hall A

Chairs: Jason Wilken (Norway), Ingrid Skaaret (Norway)

#### O 015 Ultrasound imaging for accurate EMG electrode placement in transtibial amputees: A novel approach

*Faranak Rostamjoud<sup>1</sup>, Friðrika Þorkelsdóttir<sup>2</sup>, Kristín Briem<sup>3</sup>*

<sup>1</sup> University of Iceland, Faculty of Medicine, Reykjavík, Iceland

<sup>2</sup> Össur, Biomechanics Lab, Reykjavík, Iceland

<sup>3</sup> University of Iceland, Department of Physical Therapy, Faculty of Medicine, Reykjavík, Iceland

#### O 016 Compensatory trunk movements of transfemoral amputees when walking with different gait velocities

*Eva Proebsting<sup>1</sup>, Malte Bellmann<sup>1,2</sup>, Harald Böhm<sup>2,3</sup>, Michael Ernst<sup>1</sup>, Barbara Pobatschnig<sup>1</sup>, Thomas Schmalz<sup>4</sup>, Veit Schopper<sup>4</sup>, Ursula Trömler<sup>5</sup>*

<sup>1</sup> Ottobock SE & Co. KGaA, Clinical Research and Services, Göttingen, Germany

<sup>2</sup> HAWK, University of applied sciences and arts, Göttingen, Germany

<sup>3</sup> KIZ Chiemgau, Biomechanical Lab, Aschau i. Chiemgau, Germany

<sup>4</sup> German Sport University Cologne, Sport, Cologne, Germany

<sup>5</sup> BG Klinik Ludwigshafen, Motoriklabor, Ludwigshafen, Germany

#### O 017 Self-reported prosthetic mobility of lower limb prosthetic users in Norway

*Terje Gjøvaag<sup>1</sup>, Linn Reed-Schwanborg<sup>2</sup>, Mari Bergelien Solberg<sup>2</sup>, Ingrid Iversen Langseth<sup>2</sup>, Inger Marie Starholm<sup>2</sup>*

<sup>1</sup> Oslo Metropolitan University, Rehabilitation Research and Health Technology, Oslo, Norway

<sup>2</sup> Prosthetic and Orthotic, Rehabilitation Science and Health Technology, Oslo, Norway

#### O 018 Prediction of the optimal ankle foot orthosis stiffness using peak ankle moment when walking on shoes-only in neuromuscular diseases

*Niels Waterval<sup>1</sup>, Elisa Arch<sup>2</sup>, Frans Noller<sup>1</sup>, Merel-Anne Brehm<sup>1</sup>*

<sup>1</sup> Amsterdam UMC, Rehabilitation Medicine, Amsterdam, Netherlands

<sup>2</sup> University of Delaware, Department of Kinesiology and Applied Physiology, Newark, USA

#### O 019 A predictive simulation study to assess the effect of ankle foot orthosis stiffness on balance recovery after tripping

*Eva Schobkenkamp<sup>1</sup>, Marjolein van der Krogt<sup>1</sup>, Eline van der Kruk<sup>2</sup>, Niels Waterval<sup>1</sup>*

<sup>1</sup> Amsterdam UMC, Rehabilitation Medicine, Amsterdam, Netherlands

<sup>2</sup> TU Delft, Department of Biomechanical Engineering, Delft, Netherlands

## O 020 Preliminary feasibility and validity of the ADJUST-AFO

*Rein Miedema<sup>1,2</sup>, Niels Waterval<sup>1,2</sup>, Frans Nollet<sup>1,2</sup>, Jaap Harlaar<sup>3,4</sup>, Merel Brehm<sup>1,2</sup>*

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<sup>3</sup> *Delft University of Technology, Biomechanical Engineering, Delft, Netherlands*

<sup>4</sup> *Erasmus University Medical Center, Orthopedics & Sports Medicine, Rotterdam, Netherlands*

## O 021 Rocker shoe apex settings do not influence foot progression angle during second and third rocker

*Rifko Rahmat Kurnianto<sup>1,2</sup>, Maarten Segeren<sup>3</sup>, Juba Hijmans<sup>4</sup>, Christian Greve<sup>1</sup>, Han Houdijk<sup>1</sup>*

<sup>1</sup> *University Medical Center Groningen, Department of Human Movement Sciences, Groningen, Netherlands*

<sup>2</sup> *Institut Teknologi Bandung, Industrial Engineering Department, Bandung, Indonesia*

<sup>3</sup> *University of Groningen, Faculty of Medical Sciences, Groningen, Netherlands*

<sup>4</sup> *University Medical Center Groningen, Department of Rehabilitation Medicine, Groningen, Netherlands*

## O 022 Effectiveness and cost-effectiveness of specialized orthotic care for improving functioning in adults with neuromuscular disorders: a randomized controlled trial

*Elza Van Duijnboven<sup>1,2</sup>, Fieke Sophia Koopman<sup>1,2</sup>, Jana Tuijtelars<sup>1,2</sup>, Viola Altmann<sup>3</sup>,*

*Johanna Maria van Dongen<sup>2,4</sup>, Manon Janse<sup>5</sup>, Frans Nollet<sup>1,2</sup>, Merel-Anne Brehm<sup>1,2</sup>*

<sup>1</sup> *Amsterdam UMC- location University of Amsterdam, Department of Rehabilitation Medicine, Amsterdam, Netherlands*

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<sup>3</sup> *Klimmendaal, Rehabilitation Center, Arnhem, Netherlands*

<sup>4</sup> *Vrije Universiteit Amsterdam, Department of Health Sciences, Amsterdam, Netherlands*

<sup>5</sup> *Reade, Center for Rehabilitation & Rheumatology, Amsterdam, Netherlands*

## O 023 Impact of a 3D-Printed Orthosis on the knee biomechanics in Individuals with Anterior Cruciate Ligament Injury during Daily Activities

*Florian Mougin<sup>1</sup>, Mickaël Begon<sup>1</sup>, Gauthier Desmyttere<sup>1</sup>, Jacinte Bleau<sup>2</sup>, Marie-Lyne Nault<sup>3</sup>,*

*Yosra Cherni<sup>1</sup>*

<sup>1</sup> *Université de Montréal, Montréal Qc Canada, Kinésiologie, Montréal, Canada*

<sup>2</sup> *Médecus - Canada, Médecine, Montréal, Canada*

<sup>3</sup> *Centre de Recherche Azrieli du CHU Sainte-Justine - Montréal Qc Canada, Kinésiologie, Montréal, Canada*

## Parallel Session:

### 4) Modelling and simulation

14:45–16:15, Hall B

Chairs: Stéphane Armand (Switzerland), Lanie Gutierrez Farewik (Sweden)

#### O 024 Modeling impairments in predictive simulations of walking in children with CP: A series of case studies

*Bram Van Den Bosch<sup>1</sup>, Anja Van Campenhout<sup>2,3</sup>, Kaat Desloovere<sup>4,5</sup>, Ilse Jonkers<sup>1</sup>, Friedl De Groot<sup>1</sup>*

<sup>1</sup> KU Leuven, Department of Movement Sciences, Leuven, Belgium

<sup>2</sup> KU Leuven, Department of Development and Regeneration, Leuven, Belgium

<sup>3</sup> UZ Leuven, Woman and Child, Leuven, Belgium

<sup>4</sup> KU Leuven, Department of Rehabilitation Sciences, Leuven, Belgium

<sup>5</sup> UZ Leuven, Clinical Movement Analysis Laboratory, Pellenberg, Belgium

#### O 025 How does Gluteus Medius Electromyography Signal Clustering improve management of Duchenne gait in patients with Cerebral Palsy?

*Mehrdad Davoudi<sup>1</sup>, Firooz Salami<sup>1</sup>, Robert Reising<sup>1</sup>, Sebastian Wolf<sup>1</sup>*

<sup>1</sup> Heidelberg University Hospital, Clinic for Orthopedics and Trauma Surgery, Heidelberg, Germany

#### O 026 Neuro-musculoskeletal modelling informed rehabilitation in Parkinson's disease: Comparison between overground robotic training and physical therapy

*Giulio Rigoni<sup>1</sup>, Marco Romanato<sup>2</sup>, Elena Pegolo<sup>1</sup>, Fabiola Spolaor<sup>1</sup>, Annamaria Guiotto<sup>1</sup>,*

*Fulvia Fichera<sup>3</sup>, Daniele Volpe<sup>3</sup>, Federica Cibirin<sup>4</sup>, Zimi Sawacha<sup>1</sup>*

<sup>1</sup> Dept of Information Engineering, University of Padova, Padova, Italy

<sup>2</sup> Institut du Cerveau, Paris Brain Institute, Paris, France

<sup>3</sup> Fresco Parkinson Center, Villa Margherita, Vicenza, Italy

<sup>4</sup> BBSof S.r.l, Spinoff University of Padova, Padova, Italy

#### O 027 In-silico informed gait retraining for the treatment of knee osteoarthritis

*Bryce Killen<sup>1</sup>, Gil Serranocol<sup>2</sup>, Friedl De Groot<sup>1</sup>, Ilse Jonkers<sup>1</sup>*

<sup>1</sup> KU Leuven, Human Movement Biomechanics Research Group, Leuven, Belgium

<sup>2</sup> Universitat Politècnica de Catalunya, Simulation and Movement Analysis Lab, Barcelona, Spain

#### O 028 Multi-scale mechanobiological growth simulations can differentiate between individuals with different femoral growth patterns

*Willi Koller<sup>1,2</sup>, Gabriel Mindler<sup>3</sup>, Andreas Kranzl<sup>4</sup>, Martin Svehlik<sup>5</sup>, Arnold Baca<sup>1</sup>, Hans Kainz<sup>1</sup>*

<sup>1</sup> Centre for Sport Science and University Sports- University of Vienna, Department of Sport and Human Movement Science, Vienna, Austria

<sup>2</sup> University of Vienna, Vienna Doctoral School of Pharmaceutical- Nutritional and Sport Sciences, Vienna, Austria

<sup>3</sup> Orthopaedic Hospital Speising, Department of Pediatric Orthopaedics, Vienna, Austria

<sup>4</sup> Orthopaedic Hospital Speising, Laboratory for Gait and Human Movements, Vienna, Austria

<sup>5</sup> Medical University of Graz, Department of Orthopedics and Traumatology, Graz, Austria



**O 029 The shape and size of the femur adapts during growth to maintain a constant cartilage load**

*Hans Kainz<sup>1</sup>, Willi Koller<sup>1</sup>, Markus Bastir<sup>2</sup>, Martin Svehlik<sup>3</sup>, Michael H. Schwartz<sup>4</sup>*

<sup>1</sup> *University of Vienna, Centre for Sport Science and University Sports - Department of Biomechanics - Kinesiology and Computer Science in Sport, Vienna, Austria*

<sup>2</sup> *Museo Nacional de Ciencias Naturales CSIC, Department of Paleobiology, Madrid, Spain*

<sup>3</sup> *Medical University of Graz, Department of Orthopedics and Traumatology, Graz, Austria*

<sup>4</sup> *University of Minnesota, Department of Orthopedic Surgery, Minnesota, USA*

**O 030 Morphometric analysis of growth-related changes in femoral geometry**

*Markus Bastir<sup>1</sup>, Willi Koller<sup>2</sup>, Hans Kainz<sup>2</sup>*

<sup>1</sup> *Museo Nacional de Ciencias Naturales CSIC, Department of Paleobiology, Madrid, Spain*

<sup>2</sup> *University of Vienna, Centre for Sport Science and University Sports - Department of Biomechanics - Kinesiology and Computer Science in Sport, Vienna, Austria*

**O 031 Predicting paediatric lower limb bone geometry and clinical bone measurements using 8 bony landmarks**

*Laura Carman<sup>1</sup>, Julie Choise<sup>1</sup>, Thor Besier<sup>1</sup>*

<sup>1</sup> *Auckland Bioengineering Institute - The University of Auckland, Musculoskeletal Modelling Group, Auckland, New Zealand*

*Parallel Session:*

*5) Stability and fall risk*

*14:45–16:15, Hall C*

*Chairs: Arve Opheim (Norway), Neil Postans (United Kingdom)*

**O 032 Children with developmental coordination disorder walk cautiously and resist forward-falling perturbations better than typical, but do not improve with practice**

*Heloise Debelle<sup>1</sup>, Mark Hollands<sup>1</sup>, Richard Foster<sup>1</sup>, Greg Wood<sup>2</sup>, Constantinos Maganaris<sup>1</sup>, Thomas O'Brien<sup>1</sup>*

<sup>1</sup> *Liverpool John Moores University, School of Sport and Exercise Sciences, Liverpool, United Kingdom*

<sup>2</sup> *Manchester Metropolitan University, Department of Sport and Exercise Sciences, Manchester, United Kingdom*

**O 033 Effect of visual input on gait stability using immersive virtual reality in children with cerebral palsy**

*Regine Zibold<sup>1</sup>, Morgan Sangeux<sup>1</sup>, Rebecca Winter<sup>1</sup>, Rosa Visscher<sup>2</sup>, Philippe Claude Cattin<sup>3</sup>, Elke Viehweger<sup>1</sup>*

<sup>1</sup> *University Children's Hospital Basel, Laboratory for Movement Analysis, Basel, Switzerland*

<sup>2</sup> *Kalaidos University of Applied Sciences, Careum School of Health, Zurich, Switzerland*

<sup>3</sup> *University of Basel, Department of Biomedical Engineering, Allschwil, Switzerland*

**O 034 Children with cerebral palsy avoid stepping in potholes with mediolateral changes in foot placement that cause laterally instability**

*Rebecca Louise Walker<sup>1</sup>, Thomas D O'Brien<sup>1</sup>, Gabor J Barton<sup>1</sup>, Bernie Carter<sup>2</sup>, David M Wright<sup>3</sup>, Richard J Foster<sup>1</sup>*

<sup>1</sup> *Liverpool John Moores University, Research Institute for Sport and Exercise Sciences, Liverpool, United Kingdom*

<sup>2</sup> *Edge Hill University, Faculty of Health - Social Care and Medicine, Ormskirk, United Kingdom*

<sup>3</sup> *Alder Hey Children's NHS Foundation Trust, North West Movement Analysis Centre, Liverpool, United Kingdom*

**O 035 Effect of chronic neck pain on standing stability and functional mobility speed under single-task, and cognitive and motor dual-tasks conditions**

*Gülşah Çallıoğlu<sup>1</sup>, Müge Kırmızı<sup>1</sup>, Sevrap Uçurum<sup>1</sup>*

<sup>1</sup> *Izmir Katip Celebi University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Izmir, Turkey*

**O 036 Simple dynamic stability indicators for characterising and supporting the diagnosis of patients suffering from severe bilateral vestibulopathy**

*Gautier Grouvel<sup>1</sup>, Anissa Boutabla<sup>2</sup>, Julie Corre<sup>2</sup>, Rebecca Revol<sup>2</sup>, Samuel Cavuscens<sup>2</sup>, Maurizio Ranieri<sup>2</sup>, Raymond van de Berg<sup>3</sup>, Nils Guinand<sup>2</sup>, Angélica Pérez-Fornos<sup>2</sup>, Stéphane Armand<sup>4</sup>*

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<sup>2</sup> *Geneva University Hospitals and University of Geneva, Division of Otorhinolaryngology Head and Neck Surgery, Geneva, Switzerland*

<sup>3</sup> *Maastricht University Medical Center, Division of Balance Disorders - Department of Otorhinolaryngology and Head and Neck Surgery, Maastricht, Netherlands*

<sup>4</sup> *Geneva University Hospitals and University of Geneva, Kinesiology Laboratory, Geneva, Switzerland*

**O 037 “It was probably because of lockdown that I fell”: Older adults’ experiences of independent living in relation to stair falls**

*Emily Wharton<sup>1</sup>, Thomas O'Brien<sup>1</sup>, Clarissa Giebel<sup>2</sup>, Richard Foster<sup>1</sup>, Constantinos Maganaris<sup>1</sup>*

<sup>1</sup> *Liverpool John Moores University, School of Sport and Exercise Science, Liverpool, United Kingdom*

<sup>2</sup> *NHR Applied Research Collaboration North West Coast, Health and Care Across the Life Course, Liverpool, United Kingdom*

**O 038 The influence of single-session blocked vs. randomized perturbation-based balance training on dynamic stability in young adults**

*Melina Beyerlein<sup>1</sup>, Michael Herzog<sup>1</sup>, Thorsten Stein<sup>1</sup>*

<sup>1</sup> *Karlsruhe Institute of Technology KIT, BioMotion Center - Institute of Sports and Sports Science IfSS, Karlsruhe, Germany*

**O 039 Simulating slipping responses through an innovative mechanical perturbation algorithm**

*Marina Geissmann<sup>1</sup>, Linard Filli<sup>1,2</sup>*

<sup>1</sup> *Balgrist Campus, Swiss Center for Movement Analysis, Zurich, Switzerland*

<sup>2</sup> *University Hospital Balgrist, Spinal Cord Injury Center, Zurich, Switzerland*

**O 040 The effect of treadmill belt acceleration on muscle force in the elderly: A preliminary study**

*Michalina Błażkiewicz-Janeczko<sup>1</sup>*

<sup>1</sup> *The Józef Piłsudski University of Physical Education in Warsaw, Rehabilitation, Warsaw, Poland*

**Coffee Break**

16:15–16:45

*Parallel Session:*

**6) Spinal cord injury and rehabilitation**

16:45–17:45, Hall A

*Chairs: Reidun Birgitta Jahnsen (Norway), Martin Gough (United Kingdom)*

**O 041 The correlation between foot centre of pressure indexes and knee adduction moment during walking with orthotic shoes**

*Ziang Jiang<sup>1</sup>, Demian Siegwart<sup>1</sup>, Jana Ender<sup>1</sup>, William Taylor<sup>1</sup>, Qiang Zhang<sup>1</sup>*

<sup>1</sup> *Institute for Biomechanics, Department of Health Sciences and Technology, Zurich, Switzerland*

**O 042 Effects of Ankle-foot orthoses on gait in children with cerebral palsy investigated with a gait classification system**

*Tobias Gojhl<sup>1</sup>, David Rusaw<sup>2</sup>, Karin Roeleveld<sup>1</sup>, Siri Merete Brendevik<sup>1</sup>*

<sup>1</sup> *NTNU, Department of Neuromedicine and Movement Science, Trondheim, Norway*

<sup>2</sup> *University of Jönköping, Department of Rehabilitation, Jönköping, Sweden*

**O 043 A nudge in the right direction? The effects of anteroposterior forces on body weight supported gait**

*Samme Ettema<sup>1,2</sup>, Tom J.W. Buurke<sup>2,3</sup>, Sina David<sup>4</sup>, Coen A.M. van Bennekom<sup>1,5</sup>, Han Houdijk<sup>2</sup>*

<sup>1</sup> *Helimare Rehabilitation, Research and Development, Wijk aan Zee, Netherlands*

<sup>2</sup> *University of Groningen - University Medical Center Groningen, Department of Human Movement Sciences, Groningen, Netherlands*

<sup>3</sup> *KU Leuven, Department of Movement Sciences, Leuven, Belgium*

<sup>4</sup> *Vrije Universiteit Amsterdam - Amsterdam Movement Sciences, Department of Human Movement Sciences, Amsterdam, Netherlands*

<sup>5</sup> *Amsterdam UMC, Department of Public and Occupational Health, Amsterdam, Netherlands*

**O 044 Factors influencing gait performance in persons with spinal cord injury**

*Minh Truong<sup>1</sup>, Emelie Butler Forslund<sup>2</sup>, Åke Seiger<sup>2</sup>, Lanie Gutierrez Farewik<sup>1</sup>*

<sup>1</sup> *KTH Royal Institute of Technology, KTH MoveAbility, Dept. Engineering Mechanics, Stockholm, Sweden*

<sup>2</sup> *Karolinska Institutet and Aleris Rehab Station, Department of Neurobiology- Care Science and Society, Stockholm, Sweden*

**O 045 Role of 3D Gait Analysis in targeted rehabilitation for enhancing outcomes in patients with Spinal Cord Injury**

*Manish Gupta<sup>1</sup>, Bhavuk Garg<sup>1</sup>, Rajesh Malhotra<sup>1</sup>, Madhusudan Pa<sup>2</sup>, Anoop Chawla<sup>3</sup>, Sudipto Mukherjee<sup>3</sup>, Kausbik Mukherjee<sup>3</sup>*

<sup>1</sup> *All India Institute of Medical Sciences, Orthopaedics, New Delhi, India*

<sup>2</sup> *Defense Institute of Physiology & Allied Science, Defence Research & Development Organisation, Delhi, India*

<sup>3</sup> *Indian Institute of Technology, Department of Mechanical Engineering, Delhi, India*

*Parallel Session:*

*7) Adult neurological disorders and orthopaedics*

*16:45–17:45, Hall B*

*Chairs: Anders Holsgaard-Larsen (Denmark), Stephen Cooke (United Kingdom)*

**O 046 How do gait outcomes evolve in adults with spastic cerebral palsy who received orthopedic care in childhood?**

*Anne Tabard-Fougère<sup>1</sup>, Alice Bonnefoy-Mazure<sup>1</sup>, Oscar Vazquez<sup>1</sup>, Geraldo de Coulon<sup>1</sup>, Stephane Armand<sup>1</sup>*

<sup>1</sup> *Geneva University Hospitals and University of Geneva, Willy Taillard Laboratory of Kinesiology, Geneva, Switzerland*

**O 047 Long-term Outcomes of Multilevel Surgery in Adults with Cerebral Palsy: A Prospective Study**

*Merete Aarsland Fosdahl<sup>1</sup>, Ingrid Skaaret<sup>2</sup>, Per Reidar Hoiness<sup>3</sup>, Terje Terjesen<sup>4</sup>*

<sup>1</sup> *Oslo University Hospital, Department of Clinical Neuroscience for Children, Oslo, Norway*

<sup>2</sup> *Oslo Metropolitan University, Department of Prosthetics and Orthotics, Oslo, Norway*

<sup>3</sup> *Drammen Hospital, Department of Orthopaedics, Drammen, Norway*

<sup>4</sup> *Oslo University Hospital, Division of Orthopaedic Surgery, Oslo, Norway*

**O 048 Changes in Lower Limb Asymmetry following Intensive Balance Training in adults with Chronic Stroke**

*Aleksander Solberg<sup>1</sup>, Ingvild Koren Maalen-Jobansen<sup>1</sup>, Sandra Linnea Klund-Hansen<sup>1</sup>, Marianne Nilsen<sup>2</sup>, Marit Eline Spørck<sup>1</sup>, Cecilie Aasland Schau<sup>2</sup>, Charlotta Hamre<sup>1</sup>*

<sup>1</sup> *Sunnaas Rehabilitation Hospital, Research Department, Nesodden, Norway*

<sup>2</sup> *Sunnaas Rehabilitation Hospital, Brain Injury Rehabilitation, Nesodden, Norway*

**O 049 Associations and change in knee function, pain, and biomarkers of bone- and cartilage degradation in individuals with knee osteoarthritis**

*Josefine Eriksson Naili<sup>1</sup>, Morten Bilde Simonsen<sup>2,3</sup>, Cecilia Aulin<sup>4</sup>*

<sup>1</sup> Karolinska Institutet and Karolinska University Hospital, Dept. of Women's and Children's Health, Stockholm, Sweden

<sup>2</sup> Aalborg University, Department of Materials and Production, Aalborg, Denmark

<sup>3</sup> Aalborg University, Center for Mathematical Modeling of Knee Osteoarthritis, Aalborg, Denmark

<sup>4</sup> Karolinska Institutet, Department of Medicine Solna- Division of Rheumatology - Centre for Molecular Medicine, Stockholm, Sweden

**O 050 Three-Dimensional gait kinematics in older adults after stable trochanteric fracture**

*Andréia Carvalho<sup>1,2</sup>, Jos Vanrenterghem<sup>2</sup>, Filomena Carnide<sup>1</sup>, Ana Assunção<sup>1</sup>, Nádía Veiga<sup>3</sup>, António Prieto Vêloso<sup>1</sup>, Vera Moniz-Pereira<sup>1</sup>*

<sup>1</sup> Faculdade de Motricidade Humana - Universidade de Lisboa, Laboratório de Biomecânica e Morfologia Funcional - CIPER, Dafundo - Lisboa, Portugal

<sup>2</sup> Faculty of Movement and Rehabilitation Sciences - KU Leuven, Research Group for Musculoskeletal Rehabilitation, Leuven, Belgium

<sup>3</sup> ULS São José, CRI-TO - Centro de Responsabilidade Integrada de Traumatologia Ortopédica, Lisboa, Portugal

**O 051 Increased posterior pincer might drive higher risk of hip osteoarthritis in adult spinal deformity with high pelvic retroversion**

*Elena Jaber<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Abir Massaad<sup>1</sup>, Ali Rteil<sup>1</sup>, Elma Ayoub<sup>1</sup>, Maria Saad<sup>1</sup>, Celine Chaaya<sup>1</sup>, Mohamad Karam<sup>1</sup>, Ismat Ghanem<sup>1</sup>, Ayman Assi<sup>1,2</sup>, Maria Asmar<sup>1</sup>*

<sup>1</sup> Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon

<sup>2</sup> Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France

**Parallel Session:**

**8) Markerless Motion Capture**

16:45–17:45, Hall C

Chairs: Sebastian Wolf (Germany), Georgios Gkrimas (Greece)

**O 052 Bridging the gap between markerless and marker-based gait angles with shallow neural networks**

*Gabor Barton<sup>1</sup>, Henni Greaves<sup>2</sup>, Richard Foster<sup>1</sup>*

<sup>1</sup> Liverpool John Moores University, Research Institute for Sport and Exercise Sciences, Liverpool, United Kingdom

<sup>2</sup> Alder Hey Children's Hospital NHS Trust, North West Movement Analysis Centre, Liverpool, United Kingdom

**O 053 Comparison of lower-body 3D gait kinematics between Theia3D markerless and IOR and CGM marker-based models in healthy subjects**

*Jacqueline Pitzer<sup>1</sup>, Tobias Siebert<sup>1</sup>, Vincent Fohanno<sup>2</sup>, Sonia D'Souza<sup>3</sup>*

<sup>1</sup> University of Stuttgart, Motion and Exercise Science, Stuttgart, Germany

<sup>2</sup> Qualisys AB, Software and Application, Gothenburg, Sweden

<sup>3</sup> Olghospital - Klinikum Stuttgart, Gait Lab - Orthopaedics, Stuttgart, Germany

**O 054 Single camera markerless motion capture in children with gait pathology**

*Elyse Passmore<sup>1,2,3,4</sup>, Erich Rutz<sup>3,4,5</sup>, Gareth Ball<sup>1,3</sup>*

<sup>1</sup> Murdoch Children's Research Institute, Developmental Imaging, Melbourne, Australia

<sup>2</sup> University of Melbourne, Engineering and Information Technology, Melbourne, Australia

<sup>3</sup> University of Melbourne, Medicine Dentistry and Health Sciences, Melbourne, Australia

<sup>4</sup> Royal Children's Hospital, Gait Analysis Laboratory, Melbourne, Australia

<sup>5</sup> University of Basel, Medical Faculty, Basel, Switzerland

**O 055 Impact of infrared interference on Azure Kinect's motion tracking performance during validation studies against marker-based gold standard**

*Silvia Zaccardi<sup>1,2</sup>, Redona Brabimetaj<sup>1</sup>, Erick Rodriguez<sup>1</sup>, Sven Van Den Bergh<sup>2</sup>, Mona Ibrahim<sup>2</sup>, Eva Swinnen<sup>2</sup>, David Beckwée<sup>2</sup>, Bart Jansen<sup>1</sup>*

<sup>1</sup> Vrije Universiteit Brussel, Department of Electronics and Informatics ETRO, Brussel, Belgium

<sup>2</sup> Vrije Universiteit Brussel, Rehabilitation Research Group RERE, Brussel, Belgium

**O 056 Inter-session repeatability of a Smartphone-based 3D Markerless system to assess joint Kinematics for walking and a sit-to-stand task**

*Brian Horsak<sup>1</sup>, Kerstin Prock<sup>1</sup>, Bernhard Dumphart<sup>2</sup>*

<sup>1</sup> St. Pölten University of Applied Sciences, Center for Digital Health and Social Innovation, St. Pölten, Austria

<sup>2</sup> St. Pölten University of Applied Sciences, Institute of Health Sciences, St. Pölten, Austria

**O 057 To undress or not: Effects of clothing conditions on smartphone-based 3D markerless motion capture**

*Brian Horsak<sup>1</sup>, Maximilian Pubr<sup>2</sup>, Kerstin Prock<sup>1</sup>, Mark Simonlehner<sup>3</sup>, Bernhard Dumphart<sup>3</sup>*

<sup>1</sup> St. Pölten University of Applied Sciences, Center for Digital Health and Social Innovation, St. Pölten, Austria

<sup>2</sup> Study Program Digital Healthcare, Departement of Health, St. Pölten, Austria

<sup>3</sup> St. Pölten University of Applied Sciences, Institute of Health Sciences, St. Pölten, Austria

**ESMAC Annual General Assembly**

17:45–18:45, Hall A

**Vicon User Group Social**

19:00–21:00, ROOR

Friday, 13 September 2024

## Charity Run

07:00–08:00

## Plenary Session: 9) Foot and Ankle

08:30–10:00, Hall A

Chairs: *Jesper Bencke (Denmark), Thomas Dreber (Switzerland)*

### 0 058 ☆ Concurrent validation of a new foot deviation index metric for multisegmental foot models

*Bruce Macwilliams<sup>1</sup>, Mark McMulkin<sup>2</sup>, Prabhav Saraswat<sup>3</sup>*

<sup>1</sup> *University of Utah, Orthopedics, Salt Lake City, USA*

<sup>2</sup> *Shriners Children's, Movement Analysis Center, Spokane, USA*

<sup>3</sup> *Shriners Children's, Movement Analysis Center, Greenville, USA*

### 0 059 ☆ Influence of muscle activation on articular ankle joint mechanics

*Barbara Postolka<sup>1</sup>, Bryce A. Killen<sup>1</sup>, Hannelore Boey<sup>1</sup>, Jos Vander Sloten<sup>2</sup>, Ilse Jonkers<sup>1</sup>*

<sup>1</sup> *KU Leuven, Department of Movement Sciences, Leuven, Belgium*

<sup>2</sup> *KU Leuven, Department of Mechanical Engineering, Leuven, Belgium*

### 0 060 Medio-lateral forefoot segmentation for clinical gait analysis based on metatarsal subunit rigidity and angular motion

*Amy Zavatsky<sup>1</sup>, Po-Hsiang Chan<sup>1</sup>, Julie Stebbins<sup>2</sup>*

<sup>1</sup> *University of Oxford, Department of Engineering Science, Oxford, United Kingdom*

<sup>2</sup> *Oxford University Hospitals, Oxford Gait Laboratory, Oxford, United Kingdom*

### 0 061 Optimizing clinical outcomes: Modeling individual muscle force responses to Achilles tendon lengthening surgery using tendon forces quantified in vivo

*Cemre Su Kaya Keles<sup>1</sup>, Firooz Salami<sup>2</sup>, Sebastian I. Wolf<sup>1</sup>, Filiz Ates<sup>1</sup>*

<sup>1</sup> *University of Stuttgart, Institute of Structural Mechanics and Dynamics in Aerospace Engineering, Stuttgart, Germany*

<sup>2</sup> *Heidelberg University Hospital, Clinic for Orthopedics, Heidelberg, Germany*

### 0 062 The effect of serial casting on medial gastrocnemius muscle architecture in children with idiopathic toe walking

*Christiana Barker<sup>1,2</sup>, Nichola Wilson<sup>2,3</sup>, Susan Stott<sup>2,3</sup>, Antoine Nordez<sup>4</sup>, Peter McNair<sup>1</sup>*

<sup>1</sup> *Auckland University of Technology, Health and Rehabilitation Research Institute, Auckland, New Zealand*

<sup>2</sup> *Starship Child Health, Paediatric Orthopaedics, Auckland, New Zealand*

<sup>3</sup> *University of Auckland, Faculty of Medical and Health Sciences, Auckland, New Zealand*

<sup>4</sup> *University of Nantes, Movement-Interactions-Performance, Nantes, France*

**O 063 Needle vs. Open Z-Lengthening for Achilles Tendon in CP: One-Year 3D Gait Analysis Results**

*Per Reidar Hoiness<sup>1</sup>, Merete Fosdahl<sup>2</sup>*

<sup>1</sup> Drammen Hospital, Orthopedic Dept, Drammen, Norway

<sup>2</sup> Oslo University Hospital, Pediatric Department, Oslo, Norway

**O 064 Gait parameters in children with late clubfoot relapse after initial conservative therapy are different**

*Barbara Szazi<sup>1</sup>, Britta K. Krautwurst<sup>2</sup>, Gianna Klucker<sup>1</sup>, Thomas Dreher<sup>2</sup>, Sandro Canonica<sup>2</sup>, Tanja Kraus<sup>3</sup>*

<sup>1</sup> A collaboration between University Children's Hospital Zurich and Balgrist University Hospital, Motion Analysis Zurich, Zurich, Switzerland

<sup>2</sup> University Children's Hospital Zurich, Pediatric Orthopedics and Traumatology, Zurich, Switzerland

<sup>3</sup> Medical University Graz, Department of Trauma and Orthopedics - Pediatric and Adolescent Orthopedic and Trauma Unit, Graz, Austria

**O 065 Effects of individually optimized rocker midsoles and self-adjusting insoles on the margins of stability in individuals with diabetic peripheral neuropathy**

*Athra Malki<sup>1</sup>, Maria Baltasar Badaya<sup>1</sup>, Rienk Dekker<sup>1</sup>, Gijsbertus Jacobus Verkerke<sup>1,2</sup>, Juba Hijmans<sup>1</sup>*

<sup>1</sup> UMCG, Rehabilitation, Groningen, Netherlands

<sup>2</sup> University of Twente, Biomechanical Engineering, Enschede, Netherlands

**O 066 Effectiveness of corrective tarsal arthrodesis for pes equinovarus deformity in people with unilateral upper motor neuron syndrome**

*Bente Bloks<sup>1,2</sup>, Noël Keijsers<sup>1,2,3</sup>, Jan Willem Louwerens<sup>4</sup>, Alexander Geurts<sup>2,5</sup>, Jorik Nonnekes<sup>2,5</sup>*

<sup>1</sup> Sint Maartenskliniek, Department of Research, Nijmegen, Netherlands

<sup>2</sup> Radboud University Medical Center, Department of Rehabilitation, Nijmegen, Netherlands

<sup>3</sup> Radboud University, Department of Sensorimotor Neuroscience, Nijmegen, Netherlands

<sup>4</sup> Sint Maartenskliniek, Department of Orthopedics, Nijmegen, Netherlands

<sup>5</sup> Sint Maartenskliniek, Department of Rehabilitation, Nijmegen, Netherlands

**Moveshelf Industry Presentation**

10:00–10:15, Hall A

**Moveshelf – Movement Analysis. Standardized.**

*Johannes Gijbsers<sup>1</sup>*

<sup>1</sup> Moveshelf, Product Management, Utrecht, Netherlands

**Coffee Break**

10:15–10:45



## Keynote Lecture 2:

### Tron Krosshaug

10:45–11:30, Hall A

Chair: Terje Gjovaag (Norway)

**Using motion analysis to understand injury mechanisms and biomechanical risk factors for Anterior Cruciate Injury. A travel from year 2000 into the future**

Tron Krosshaug<sup>1</sup>

<sup>1</sup> Norwegian School of Sport Sciences, Oslo Sports Trauma Research Center and the Department of Sports Medicine, Oslo, Norway

## Kistler Industry Presentation

11:30–11:40, Hall A

**Piezoelectric sensor technology meets digital innovation**

Julian Hoch<sup>1</sup>

<sup>1</sup> Kistler, Biomechanics, Winterthur, Switzerland

## Moveck Industry Presentation

11:40–11:45, Hall A

**Moveck – On the edge of data harmonization for clinical gait analysis**

Arnaud Barré<sup>1</sup>

<sup>1</sup> Moveck Solution inc., Canada

## Plenary Session:

### 10) Sports & sports injuries

11:45–13:00, Hall A

Chairs: Tron Krosshaug (Norway), Philippe Dixon (Canada)

#### **O 067 Reliability and repeatability assessment of single camera 2D and 3D markerless approach for sport applications**

Giulio Rigoni<sup>1</sup>, Federica Cibi<sup>2</sup>, Niccolò Monaco<sup>2</sup>, Fabiola Spolaor<sup>1</sup>, Annamaria Guiotto<sup>1</sup>, Zimi Sawacha<sup>1</sup>

<sup>1</sup> Dept of Information Engineering, University of Padova, Padova, Italy

<sup>2</sup> BBSof S.r.l., Spinoff University of Padova, Padova, Italy

**O 068** ☆ **Predicting knee contact forces in walking: A comparative study of machine learning models including a physics-informed approach**

*Philipp Krondorfer<sup>1</sup>, Djordje Slijepčević<sup>2</sup>, Fabian Unglaube<sup>3</sup>, Andreas Kranz<sup>3</sup>, Matthias Zeppelzauer<sup>2</sup>, Hans Kainz<sup>4</sup>, Brian Horsak<sup>1</sup>*

<sup>1</sup> *St. Pölten University of Applied Sciences, Center for Digital Health and Social Innovation, St. Pölten, Austria*

<sup>2</sup> *St. Pölten University of Applied Sciences, Institute of Creative\Media\Technologies, St. Pölten, Austria*

<sup>3</sup> *Orthopaedic Hospital Vienna-Speising, Laboratory of Gait and Movement Analysis, Vienna, Austria*

<sup>4</sup> *University of Vienna, Centre for Sport Science and University Sports, Vienna, Austria*

**O 069** **Can a standardized anticipated or unanticipated jump-and-cut task resemble the knee joint loads of a sport-specific sidecut?**

*Ida Steendahl<sup>1</sup>, Niels J Nedergaard<sup>1</sup>, Louise Wendt Nielsen<sup>1</sup>, Jesper Bencke<sup>1</sup>*

<sup>1</sup> *Human Movement Analysis Laboratory - Department of Orthopaedic Surgery, Copenhagen University Hospital - Amager-Hvidovre, Copenhagen, Denmark*

**O 070** **Execution types and correlates of frontal knee angle in healthy adults performing split lunges**

*Klaus Widhalm<sup>1,2</sup>, Sebastian Durstberger<sup>1</sup>, Harald Penasso<sup>1</sup>, Peter Putz<sup>1</sup>, Hans Kainz<sup>3</sup>, Peter Augat<sup>2,4</sup>*

<sup>1</sup> *FH Campus Wien University of Applied Sciences, Health Sciences, Vienna, Austria*

<sup>2</sup> *Paracelsus Medical University, Institute for Biomechanics, Salzburg, Austria*

<sup>3</sup> *University of Vienna, Centre for Sport Science and University Sports- Department of Biomechanics, Vienna, Austria*

<sup>4</sup> *BG Unfallklinik Murnau, Institute for Biomechanics, Murnau, Germany*

**O 071** **The effect of motor control impairment and low back pain on the athletic performance of elite soccer players**

*Cansu Akkus<sup>1</sup>, Aynur Demirel<sup>1</sup>*

<sup>1</sup> *Hacettepe University, Department of Physiotherapy and Rehabilitation in Sports - Faculty of Physical Therapy and Rehabilitation, Ankara, Turkey*

**O 072** **Disproportional ventilatory response to acute incremental exercise in individuals with cerebral palsy**

*Linnéa Corell<sup>1</sup>, Emma Hjalmarsson<sup>1</sup>, Rodrigo Fernandez-Gonzalo<sup>2</sup>, Sebastian Edman<sup>1</sup>, Asta Kizyte<sup>3</sup>, Ruoli Wang<sup>3</sup>, Annika Kruse<sup>4</sup>, Eva Pontén<sup>1</sup>, Jessica Norrbom<sup>5</sup>, Ferdinand Von Walden<sup>1</sup>*

<sup>1</sup> *Karolinska Institutet, Women's and Children's Health, Stockholm, Sweden*

<sup>2</sup> *Karolinska Institutet, Laboratory Medicine, Stockholm, Sweden*

<sup>3</sup> *KTH, School of Engineering Sciences SCI - Engineering Mechanics, KTH MoveAbility, Stockholm, Sweden*

<sup>4</sup> *University of Graz, Department of Human Movement Science - Sport and Health, Graz, Austria*

<sup>5</sup> *Karolinska Institutet, Physiology and Pharmacology, Stockholm, Sweden*

**O 073** **Impact of Joint Hypermobility on Running: Frontal plane lower extremity biomechanics**

*Adnan Api<sup>1,2</sup>, Shavkat Nadir Kuchimov<sup>2,3</sup>, Nazif Ekin Akalan<sup>1,2</sup>, Burcu Semin Akel<sup>1,2</sup>*

<sup>1</sup> *Istanbul Kultur University, Faculty of Health Science- Physiotherapy and Rehabilitation Department, Istanbul, Turkey*

<sup>2</sup> *Istanbul Kultur University, Motion Analysis Center, Istanbul, Turkey*

<sup>3</sup> *Bogazici University, Institute of Biomedical Engineering, Istanbul, Turkey*

## Poster Panic Session II.

13:00–13:15, Hall A

## Lunch & Posters II.

13:15–14:15

### Parallel Session:

## 11) Movement analysis methodology 1 - Enhanced methods and harmonising gait data

14:15–15:30, Hall A

Chairs: Gabor Barton (United Kingdom), Domenic Grisch (Switzerland)

### O 074 Assessing the status of EMG in therapy management for patients with Cerebral Palsy through a Delphi Process

Robert Reisig<sup>1</sup>, Mehrdad Davoudi<sup>1</sup>, Firooz Salami<sup>1</sup>, Sebastian Wolf<sup>1</sup>

<sup>1</sup> Orthopädische Universitätsklinik Heidelberg, Heidelberg Motionlab, Heidelberg, Germany

### O 075 Harmonising historical clinical gait analysis data using personalised musculoskeletal models

Thor Besier<sup>1</sup>, Laura Carman<sup>1</sup>, Julie Choisine<sup>1</sup>, Elyse Passmore<sup>2</sup>, Luca Modenese<sup>3</sup>, Chris Carty<sup>4</sup>

<sup>1</sup> The University of Auckland, Auckland Bioengineering Institute, Auckland, New Zealand

<sup>2</sup> Royal Children's Hospital, Gait Analysis Laboratory, Melbourne, Australia

<sup>3</sup> University of New South Wales, Graduate School of Biomedical Engineering, Sydney, Australia

<sup>4</sup> Griffith University, Griffith Centre of Biomedical and Rehabilitation Engineering, Gold Coast, Australia

### O 076 Kinematic consistency during walking in three different treadmill-based laboratories towards big data sharing

Anke Van Bladel<sup>1,2</sup>, Rachel Senden<sup>3</sup>, Kenneth Meijer<sup>4</sup>, Pieter Meyns<sup>5</sup>, Lynn Bar-On<sup>1</sup>

<sup>1</sup> Ghent University - Faculty of Medicine and Health Sciences, Department of Rehabilitation Sciences, Ghent, Belgium

<sup>2</sup> Ghent University Hospital, Physical Medicine and Rehabilitation, Ghent, Belgium

<sup>3</sup> Maastricht University Medical Center MUMC+, Department of Physical Therapy, Maastricht, Netherlands

<sup>4</sup> Maastricht University - NUTRIM Institute for Nutrition and Translational Research in Metabolism, Department of Nutrition and Movement Sciences, Maastricht, Netherlands

<sup>5</sup> Hasselt University - Faculty of Rehabilitation Sciences, Rehabilitation Research Centre - REVAL, Hasselt, Belgium

### O 077 An enhanced characterization of gait deviations in Hemiparesis by combining knee and ankle kinematics

Lorenzo Hermez<sup>1</sup>, Nesma Houmani<sup>1</sup>, Garcia-Salicetti Sonia<sup>1</sup>, Galarraga Omar<sup>2</sup>, Vigneron Vincent<sup>3</sup>

<sup>1</sup> Télécom SudParis - Institut Polytechnique de Paris, Samovar, Palaiseau, France

<sup>2</sup> UGE.CAM Ile-de-France, Movement Analysis Laboratory, Coubert, France

<sup>3</sup> Université Paris-Saclay, Informatique - Bio-Informatique et Systèmes Complexes IBISC EA 4526, Evry, France

**O 078 Improving accuracy and reliability of upper limb inertial motion capture without increasing calibration complexity**

*Mbhairi McInnes<sup>1</sup>, Edward Chadwick<sup>1</sup>, Dimitra Blana<sup>2</sup>, Andrew Starkey<sup>1</sup>*

<sup>1</sup> University of Aberdeen, School of Engineering, Aberdeen, United Kingdom

<sup>2</sup> University of Aberdeen, School of Medicine - Medical Sciences and Nutrition, Aberdeen, United Kingdom

**O 079 Assessing gait in neurological disorders during body weight support: Nonlinear registration and statistical parametric mapping for amplitude and temporal effects**

*Morten Bøgelund Pedersen<sup>1,2</sup>, Morten Bilde Simonsen<sup>3</sup>, Anders Holsgaard-Larsen<sup>1,2</sup>*

<sup>1</sup> University of Southern Denmark, Department of Clinical Research, Odense, Denmark

<sup>2</sup> Odense University Hospital, Department of Orthopaedics and Traumatology, Odense, Denmark

<sup>3</sup> Aalborg University, Department of Materials and Production, Aalborg, Denmark

**O 080 Advanced movement and muscle analysis to evaluate motor behavior in typically developing newborns: A feasibility cohort study**

*Nathalie De Beukelaer<sup>1</sup>, Xavier Gasparutto<sup>1</sup>, Alice Bonnefoy-Mazure<sup>1</sup>, Marion Crouzier<sup>2</sup>, Stéphane Sizonenko<sup>3</sup>, Olivier Baud<sup>4</sup>, Stéphane Armand<sup>1</sup>*

<sup>1</sup> University of Geneva & University Hospital Geneva, Faculty of Medicine - Department of Surgery, Geneva, Switzerland

<sup>2</sup> Nantes University, Laboratory Movement - Interactions - Performance, Nantes, France

<sup>3</sup> University of Geneva, Division of Child Development and Growth - Department of Pediatrics, Geneva, Switzerland

<sup>4</sup> University Geneva Hospitals, Division of Neonatology and Pediatric Intensive Care, Geneva, Switzerland

*Parallel Session:*

*12) Spine & Trunk - Cervical spine and adults*

*14:15–15:30, Hall B*

*Chair: Jacqueline Romkes (Switzerland)*

**O 081 Investigation of the relationship between neck proprioception and balance parameters in patients with cervical spinal stenosis**

*Hilal Uzunlar<sup>1,2</sup>, Karya Polat<sup>3</sup>, Sevtap Gunay Ucurum<sup>1</sup>, Ismail Ertan Sevin<sup>4</sup>, Hasan Kamil Sucu<sup>4</sup>*

<sup>1</sup> Izmir Katip Celebi University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Izmir, Turkey

<sup>2</sup> Hitit University Faculty of Sports Sciences, Department of Sports Management, Corum, Turkey

<sup>3</sup> Izmir Katip Celebi University Institute Health Sciences, Department of Physiotherapy and Rehabilitation, Izmir, Turkey

<sup>4</sup> Izmir Katip Celebi University Faculty of Medicine, Department of Brain and Nerve Surgery, Izmir, Turkey

**O 082 The effect of stabilization exercise on pain intensity, muscle endurance, and balance in patients undergoing cervical laminoplasty surgery: Preliminary report**

*Hilal Uzunlar<sup>1,2</sup>, Sevtaç Gunay Ucurum<sup>1</sup>, Karya Polat<sup>1</sup>, Ismail Ertan Sevin<sup>3</sup>, Hasan Kamil Suci<sup>3</sup>*

<sup>1</sup> *Izmir Katip Celebi University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Izmir, Turkey*

<sup>2</sup> *Hitit University Faculty of Sports Sciences, Department of Sports Management, Corum, Turkey*

<sup>3</sup> *Izmir Katip Celebi University Faculty of Medicine, Department of Brain and Nerve Surgery, Izmir, Turkey*

**O 083 Head held high? Investigating the relationship between trunk flexion and head/neck position during walking in able-bodied adults across the lifespan**

*Elissa Embrechts<sup>1</sup>, Tamaya Van Criekinge<sup>2</sup>*

<sup>1</sup> *University of Antwerp, Rehabilitation Sciences and Physiotherapy, Wilrijk, Belgium*

<sup>2</sup> *Katholieke Universiteit Leuven, Rehabilitation Sciences, Brugge, Belgium*

**O 084 The gait functional score: An objective score to evaluate functional disability in patients with adult spinal deformity**

*Rami Rehayem<sup>1</sup>, Abir Massaad<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Elio Mekhael<sup>1</sup>, Nabil Nassim<sup>1</sup>, Ali Rteil<sup>1</sup>, Elma Ayoub<sup>1</sup>, Maria Saadé<sup>1</sup>, Elena Jaber<sup>1</sup>, Ayman Assi<sup>1,2</sup>, Maria Karam<sup>1</sup>*

<sup>1</sup> *Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon*

<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**O 085 Coronal malalignment and axial spinal deformity might be related to increased gait fatigue in patients with adult spinal deformity**

*Georges El Haddad<sup>1</sup>, Marc Boutros<sup>1</sup>, Abir Massaad<sup>1</sup>, Maria Karam<sup>1</sup>, Maria Asmar<sup>1</sup>, Emmanuelle Wakim<sup>1</sup>, Elio Mekhael<sup>1</sup>, Nabil Nassim<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

<sup>1</sup> *Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon*

<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**O 086 Pelvic retroversion seem to be restored during walking in mild patients with adult spinal deformity**

*Marc Boutros<sup>1</sup>, Georges El Haddad<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Aren Joe Bizdikian<sup>1</sup>, Mohamad Karam<sup>1</sup>, Nabil Nassim<sup>1</sup>, Elio Mekhael<sup>1</sup>, Ismat Ghanem<sup>1</sup>, Abir Massaad<sup>1</sup>, Ayman Assi<sup>1,2</sup>, Emmanuelle Wakim<sup>1</sup>*

<sup>1</sup> *Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon*

<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**Coffee Break**

15:30–16:00

*Parallel Session:*

*13) Movement analysis methodology 2 -  
Advances in clinical application*

16:00–17:00, Hall A

Chairs: Bruce Macwilliams (USA), Juba-Pekka Kulmala (Finland)

**O 087 The syllables of human movement under threat**

*Ulises Daniel Serratos Hernandez<sup>1</sup>, Jack Brookes<sup>1</sup>, Samson Hall<sup>1</sup>, Juliana K. Sporrer<sup>1</sup>,  
Sajjad Zabbab<sup>1</sup>, Dominik R. Bach<sup>2</sup>*

<sup>1</sup> University College London, Max Planck UCL Centre for Computational Psychiatry and Ageing Research - and Wellcome Centre for Human Neuroimaging - UCL Queen Square Institute of Neurology, London, United Kingdom

<sup>2</sup> University of Bonn, Transdisciplinary Research Area "Life and Health" - Hertz Chair for Artificial Intelligence and Neuroscience, Bonn, Germany

**O 088 Characterizing gait heterogeneity in people with incomplete spinal cord injury using data-driven techniques**

*Minh Truong<sup>1</sup>, Emelie Butler Forslund<sup>2,3</sup>, Åke Seiger<sup>2,3</sup>, Elena M. Gutierrez-Farewik<sup>1,4</sup>*

<sup>1</sup> KTH Royal Institute of Technology, KTH MoveAbility - Department of Engineering Mechanics, Stockholm, Sweden

<sup>2</sup> Karolinska Institutet, Department of Neurobiology - Care Science and Society, Stockholm, Sweden

<sup>3</sup> Aleris Rehab Station, R&D Unit, Stockholm, Sweden

<sup>4</sup> Karolinska Institutet, Department of Women's and Children's Health, Stockholm, Sweden

**O 089 Machine learning approaches for predicting Ankle Dorsi Plantar Moments in Cerebral Palsy gait analysis: A comparative study**

*Mustafa Erkam Özates<sup>1</sup>, Firooz Salami<sup>2</sup>, Sebastian I. Wolf<sup>1</sup>, Yunus Ziya Arslan<sup>3</sup>*

<sup>1</sup> Turkish German University, Department of Electrical and Electronics Engineering- Faculty of Engineering, Istanbul, Turkey

<sup>2</sup> Heidelberg University Hospital, Clinic for Orthopedics and Trauma Surgery, Heidelberg, Germany

<sup>3</sup> Turkish German University, Department of Robotics and Intelligent Systems - Institute of Graduate Studies in Science and Engineering, Istanbul, Turkey

**O 090 Enhancing gait parameter analysis for Cerebral Palsy using Attention modules**

*John Bosco Uroko<sup>1</sup>, Donging Gu<sup>1</sup>, Haider Raza<sup>1</sup>, Liang Hu<sup>2</sup>*

<sup>1</sup> University of Essex, School of Computer Science and Electronic Engineering, Essex, United Kingdom

<sup>2</sup> Harbin Institute of Technology, Department of Automation - School of Mechanical and Electrical Engineering and Automation, Shenzhen, China

**O 091 Effect of Gait Speed and Dynamic Time-Warping on the prediction of Lower-Limb Joint Angles**

*Vaibhav Shah<sup>1,2</sup>, Philippe C. Dixon<sup>3</sup>*

<sup>1</sup> University of Montreal, School of Kinesiology and Physical activity Sciences, Montreal, Canada

<sup>2</sup> The Sainte-Justine University Hospital CRCHUSJ, Research Center of the Sainte-Justine University Hospital CRCHUSJ, Montreal, Canada

<sup>3</sup> McGill University, Kinesiology and Physical Education, Montreal, Canada

**O 092 3D Gait analysis in children using wearable sensors**

*Shima Moghadam<sup>1</sup>, Ted Yeung<sup>1</sup>, Pablo Ortega Auriol<sup>1</sup>, Julie Choisne<sup>1</sup>*

<sup>1</sup> *University of Auckland, Auckland Bioengineering Institute, Auckland, New Zealand*

*Parallel Session:*

*14) Spine & Trunk - Scoliosis and upper extremity*

*16:00–17:00, Hall B*

*Chair: Ursula Trinler (Germany)*

**O 093 Use of predictive analytics for the screening of patients with adolescent idiopathic scoliosis with quantitative gait analysis**

*Christophe Boulay<sup>1</sup>, Renaud Lafage<sup>2</sup>, Benjamin Blondel<sup>3</sup>, Jean-Luc Jouve<sup>1</sup>, Sébastien Pesenti<sup>1</sup>*

<sup>1</sup> *Aix Marseille University, Gait lab - pediatric orthopaedic surgery department - Timone Children Hospital, Marseille, France*

<sup>2</sup> *Lenox Hill Hospital, Orthopedic Surgery, New York, USA*

<sup>3</sup> *Aix Marseille University, Orthopedic Surgery - CHU Timone, Marseille, France*

**O 094 Relationship of sagittal and frontal spinal curvatures and mobility with balance and respiratory functions in adolescent idiopathic scoliosis: Preliminary report**

*Sevtap Günay Ucurum<sup>1</sup>, Hilal Uzunlar<sup>1</sup>, Müge Kırmızı<sup>1</sup>, Karyya Polat<sup>1</sup>, Ebru Ozdemir<sup>2</sup>,*

*Aynur Sabin<sup>1</sup>, Kevsler Sevik Kacmaz<sup>1</sup>, Derya Ozer Kaya<sup>1</sup>*

<sup>1</sup> *Katip Celebi University, Physical Therapy and Rehabilitation, İzmir, Turkey*

<sup>2</sup> *Dokuz Eylül University, Health Science Institute, İzmir, Turkey*

**O 095 Kinematic adaptations during the sit-to-stand movement in adolescent idiopathic scoliosis with different types of curvature**

*Maria Karam<sup>1</sup>, Emmanuelle Wakim<sup>1</sup>, Maria Asmar<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Georges El Haddad<sup>1</sup>,*

*Marc Boutros<sup>1</sup>, Mohamad Karam<sup>1</sup>, Maria Rassam<sup>1</sup>, Abir Massaad<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

<sup>1</sup> *Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon*

<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**O 096 Different kinematic strategies are adopted by subjects with adolescent idiopathic scoliosis during walking depending on their type of curvature**

*Maria Asmar<sup>1</sup>, Maria Karam<sup>1</sup>, Emmanuelle Wakim<sup>1</sup>, Abir Massaad<sup>1</sup>, Mohamad Karam<sup>1</sup>,*

*Georges El Haddad<sup>1</sup>, Marc Boutros<sup>1</sup>, Ismat Ghanem<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

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<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**O 097 Two approaches to normalize biceps Brachii EMG in patients with spasticity**

*Anna Pennekamp<sup>1</sup>, Mirjam Thielen<sup>1</sup>, Julia Glaser<sup>2</sup>, Ursula Trinler<sup>1</sup>*

<sup>1</sup> BG Trauma Center Ludwigshafen, Laboratory for Clinical Movement Analysis, Ludwigshafen, Germany

<sup>2</sup> BG Trauma Center Ludwigshafen, Hand-Plastic and Reconstructive Surgery, Ludwigshafen, Germany

**O 098 Using Upper Limb Kinematics to Refine Clinical Assessment in Neuromuscular Disorders**

*Alessandra Favata<sup>1</sup>, Luc Van Noort<sup>1</sup>, Roger Gallart-Agut<sup>2</sup>, Jesica Exposito-Escudero<sup>3</sup>,*

*Julita Medina-Cantillo<sup>3</sup>, Andres Nacimiento-Osorio<sup>3</sup>, Daniel Natera de-Benito<sup>3</sup>,*

*Carme Torras-Genís<sup>2</sup>, Josep Maria Font-Llagunes<sup>1</sup>, Rosa Pàmies-Vilà<sup>1</sup>*

<sup>1</sup> Universitat Politècnica de Catalunya - UPC, Research Centre for Biomedical Engineering, Barcelona, Spain

<sup>2</sup> Institut de Robòtica i Informàtica Industrial, Perception and Manipulation, Barcelona, Spain

<sup>3</sup> Hospital Sant Joan de Déu, Neuromuscular Unit, Barcelona, Spain

**ESMAC Gala Dinner**

*19:00–23:00, Grefsenkollen Restaurant*



Saturday, 14 September 2024

*Plenary Session:*

*15) Modern methodology - Multiplanar analysis*

08:30–09:30, Hall A

Chairs: Hans Kainz (Austria), Christian Von Deimling (Switzerland)

**O 099** ☆ **The role of functional knee axis calibration in the presence of rotational malalignment in the lower limbs**

Arik Rehani Musagara<sup>1</sup>, Firooz Salami<sup>1</sup>, Marco Götz<sup>1</sup>, Katharina Gatter<sup>1</sup>, Sebastian Wolf<sup>1</sup>

<sup>1</sup> Clinic for Orthopaedics and Trauma Surgery, Heidelberg University Hospital, Heidelberg, Germany

**O 100** ☆ **A new method for accurate measurement of upper limb axial rotations with markerless motion capture using cross-sections of 4D-scans**

Fermín Basso<sup>1</sup>, Helios De Rosario-Martínez<sup>1</sup>, Rosa Porcar-Seder<sup>2</sup>, Mario Lamas-Rodríguez<sup>1</sup>, Juan López-Pascual<sup>1</sup>

<sup>1</sup> Instituto de Biomecánica de Valencia, Universitat Politècnica de València, Biomedical Engineering, Valencia, Spain

<sup>2</sup> Instituto de Biomecánica de Valencia, Universitat Politècnica de València, Market Development Area, Valencia, Spain

**O 101** **Frontal and transverse plane hip angles during walking vary between CGM2 and Plug-in-Gait models**

Jesper Bencke<sup>1</sup>, Niels J Nedergaard<sup>1</sup>, Ida B Steendahl<sup>1</sup>, Emilie Zwicky<sup>1</sup>

<sup>1</sup> Copenhagen University Hospital, Human Movement Analysis Laboratory sect. 247, Hvidovre, Denmark

**O 102** **Correlations between gait and clinical parameters and the levels of pain and mobility in adolescents with lower extremity torsional abnormality**

Marianne Gagnon<sup>1,2</sup>, Mitchell Bernstein<sup>2,3</sup>, Louis-Nicolas Veilleux<sup>1,2</sup>

<sup>1</sup> Shriners Hospitals for Children - Canada, Motion Analysis Center, Montreal, Canada

<sup>2</sup> McGill University, Departments of Surgery, Montreal, Canada

<sup>3</sup> Shriners Hospitals for Children - Canada, Department of Surgery, Montreal, Canada

**O 103** **Asymmetric sitting may contribute developing asymmetric hip and pelvis rotational profiles during walking for healthy adolescents: A pilot study**

Buse Kara<sup>1</sup>, Aleyna Kızılcın<sup>1</sup>, Nazif Ekin Akalan<sup>1,2</sup>, Shavkat Kuchimov<sup>2</sup>

<sup>1</sup> Istanbul Kultur University, Faculty of Health Sciences- Division of Physiotherapy and Rehabilitation, Istanbul, Turkey

<sup>2</sup> Istanbul Kultur University, Motion Analysis Center, Istanbul, Turkey

**O 104** ☆ **Multiple exoskeletons, multiple objectives: Simulating optimal assistance of active, quasi-passive, and passive assistive devices**

*Israel Luis<sup>1</sup>, Lanie Gutierrez Farewik<sup>1</sup>*

<sup>1</sup> *KTH Moveability - KTH Royal Institute of Technology, Engineering Mechanics, Stockholm, Sweden*

*Parallel Session:*

**16) Clinical Case Studies**

*09:30–10:30, Meeting Room 1*

*Chairs: Kaat Desloovere (Belgium), Han Houdijk (Netherlands)*

**O 105** **Multidisciplinary biomechanical evaluation of orthopedic foot surgery in cerebral palsy: A clinical case study**

*Gaia van den Heuvel<sup>1,2</sup>, Wouter Schallig<sup>1,2,3</sup>, Babette Mooijekind<sup>1,2,4</sup>, Ruud Wellenberg<sup>5</sup>, Melinda Witbreuk<sup>6</sup>, Mario Maas<sup>5</sup>, Marjolein van der Krogt<sup>1,2</sup>, Annemieke Buizer<sup>1,2,7</sup>*

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<sup>4</sup> *Ghent University, Rehabilitation Sciences, Ghent, Belgium*

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<sup>6</sup> *Amsterdam UMC location University of Amsterdam, Orthopedic Surgery and Sports Medicine, Amsterdam, Netherlands*

<sup>7</sup> *Emma Children's Hospital, Amsterdam UMC, Amsterdam, Netherlands*

**O 106** **Innovative Combination of focal vibration therapy and botulinum toxin to treat equinus in a child with unilateral spastic cerebral palsy**

*Christophe Boulay<sup>1</sup>, Jean-Michel Gracies<sup>2</sup>, Morgan Sangeux<sup>3</sup>, Guillaume Authier<sup>1</sup>, Bernard Parratte<sup>1</sup>, Sébastien Pesenti<sup>1</sup>*

<sup>1</sup> *Aix Marseille University, Gait lab- Pediatric Orthopaedic Surgery Department, Timone Children Hospital, Marseille, France*

<sup>2</sup> *AP-HP- Hôpitaux Universitaires Henri Mondor, Service de Rééducation Neurolocomotrice, Unité de Neuroéducation, Créteil, France*

<sup>3</sup> *University Children's Hospital, Basel, Switzerland*

**O 107** **L5-S1 arthrodesis impact on spino-pelvic parameters, gait, and quality-of-life in a patient with chronic low back pain with spondylolisthesis**

*Gilles Prince<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Abir Massaad<sup>1</sup>, Ibrahim Hamati<sup>1</sup>, Moustapha Rteil<sup>1</sup>, Joe Azar<sup>1</sup>, Guy Awad<sup>1</sup>, Nadim Freiha<sup>1</sup>, Mohamad Karam<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

<sup>1</sup> *Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon*

<sup>2</sup> *Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France*

**O 108 Antalgic flexed thorax posture, in static and during gait, restored by localized arthrodesis in a case of L4-L5 spondylolisthesis**

*Joe Azar<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Abir Massaad<sup>1</sup>, Guy Awad<sup>1</sup>, Gilles Prince<sup>1</sup>, Ibrahim Hamati<sup>1</sup>, Moustapha Rteil<sup>1</sup>, Nadim Freiha<sup>1</sup>, Mohamad Karam<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

<sup>1</sup> Faculty of Medicine/ University of Saint-Joseph, Laboratory of Biomechanics and Medical Imaging, Beirut, Lebanon

<sup>2</sup> Arts et Métiers, Institut de Biomecanique Humaine Georges Charpak, Paris, France

**O 109 Personalized clinical decision-making by evaluating the effects of a selective nerve block on cycling and gait: A clinical case study**

*Hanneke Van Duijnhoven<sup>1</sup>, Lotte Van De Venis<sup>1</sup>, Maarten Nijkrake<sup>1</sup>, Allan Pieterse<sup>1</sup>, Alexander Geurts<sup>1</sup>, Jorik Nonnekes<sup>1</sup>*

<sup>1</sup> Radboudumc, Rehabilitation, Nijmegen, Netherlands

**O 110 Predicting botulinum toxin-a injection effects on gait in a child with hemiparetic cerebral palsy: A case study**

*Kubra Onerge<sup>1,2,3</sup>, Nazif Ekin Akalan<sup>1,3</sup>, Rukiye Sert<sup>4</sup>, Fuat Bilgili<sup>5</sup>*

<sup>1</sup> Istanbul Kultur University, Faculty of Health Sciences- Physiotherapy and Rehabilitation Department, Istanbul, Turkey

<sup>2</sup> Hacettepe University, Graduate School of Health Sciences- Physical Therapy and Rehabilitation Division, Ankara, Turkey

<sup>3</sup> Istanbul Kultur University, Motion Analysis Center, Istanbul, Turkey

<sup>4</sup> Istanbul University, Institute of Health Sciences - Department of Pediatric Basic Sciences, Istanbul, Turkey

<sup>5</sup> Istanbul University, Istanbul Faculty of Medicine - Orthopaedics and Traumatology Department, Istanbul, Turkey

*Parallel Session:*

*17) Muscle tissue properties and development*

*09:30–10:30, Hall A*

*Chairs: Ayman Assi (Lebanon), Francesco Cenni (Italy)*

**O 111 Muscle growth and motor development in NICU graduates and infants at high-risk of adverse neurological outcome over the first year**

*Sian Williams<sup>1,2</sup>, Malcolm Battin<sup>3</sup>, Louise Pearce<sup>4</sup>, Amy Mulqueeny<sup>3</sup>, Alana Cavadino<sup>5</sup>, Mirjalili Ali<sup>6</sup>, N Susan Stott<sup>7</sup>*

<sup>1</sup> Curtin University, School of Allied Health, Perth, Australia

<sup>2</sup> University of Auckland, Liggins Institute, Auckland, New Zealand

<sup>3</sup> Te Toka Tumai, Auckland, Te Whatu Ora, Newborn Services, Starship Child Health, Auckland, New Zealand

<sup>4</sup> Auckland Children's Physiotherapy, Physiotherapy, Auckland, New Zealand

<sup>5</sup> University of Auckland, Epidemiology & Biostatistics - School of Population Health, Auckland, New Zealand

<sup>6</sup> University of Auckland, Department of Anatomy and Medical Imaging, Auckland, New Zealand

<sup>7</sup> University of Auckland, Department of Surgery, Auckland, New Zealand

## O 112 The contribution of physical activity and nutrition to muscle morphology in children with spastic cerebral palsy

*Ineke Verreydt<sup>1</sup>, Anja Van Campenbout<sup>2,3</sup>, Els Ortibus<sup>2</sup>, Olaf Verschuren<sup>4</sup>, Marieke De Craemer<sup>5</sup>, Lauraine Staut<sup>1</sup>, Erika Vanhauwaert<sup>6</sup>, Daisy Rymen<sup>2</sup>, Kaat Desloovere<sup>1,7</sup>*

<sup>1</sup> KU Leuven, Department of Rehabilitation Sciences, Leuven, Belgium

<sup>2</sup> KU Leuven, Department of Development and Regeneration - Faculty of Medicine, Leuven, Belgium

<sup>3</sup> University Hospitals Leuven, Pediatric Orthopedics, Department of Orthopedics, Leuven, Belgium

<sup>4</sup> Utrecht University and De Hoogstraat Rehabilitation, Center of Excellence for Rehabilitation Medicine - UMC Utrecht Brain Center - University Medical Center Utrecht, Utrecht, Netherlands

<sup>5</sup> Ghent University, Department of Rehabilitation Sciences, Ghent, Belgium

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<sup>7</sup> University Hospitals Leuven, Clinical Motion Analysis Laboratory, Pellenberg, Belgium

## O 113 Spatial distribution of intramuscular fat in triceps surae in children with cerebral palsy

*Zhongzheng Wang<sup>1</sup>, Chen Xu<sup>1</sup>, Antea Destro<sup>1</sup>, Sven Petersson<sup>2,3</sup>, Eva Pontén<sup>4,5</sup>, Cecilia Lidbeck<sup>4,5</sup>, Ruoli Wang<sup>1</sup>*

<sup>1</sup> KTH Royal Institute of Technology, KTH MoveAbility - Department of Engineering Mechanics, Stockholm, Sweden

<sup>2</sup> Karolinska Institutet, Department of Clinical Neuroscience, Stockholm, Sweden

<sup>3</sup> Karolinska University Hospital, Department of Medical Radiation Physics and Nuclear Medicine, Stockholm, Sweden

<sup>4</sup> Karolinska Institutet, Department of Women's and Children's Health, Stockholm, Sweden

<sup>5</sup> Astrid Lindgren Children's Hospital - Karolinska University Hospital, Department of Pediatric Orthopaedic Surgery, Stockholm, Sweden

## O 114 Morphological changes of the semitendinosus muscle among ambulant children with spastic cerebral palsy

*Nathalie De Beukelaer<sup>1,2,3</sup>, Ineke Verreydt<sup>3</sup>, Ines Vandekerckhove<sup>3</sup>, Britta Hansen<sup>3</sup>, Tjil Dewit<sup>3</sup>, Els Ortibus<sup>2</sup>, Anja Van Campenbout<sup>4,5</sup>, Kaat Desloovere<sup>3</sup>*

<sup>1</sup> University of Geneva, Kinesiology Laboratory - Department of Surgery, Geneva, Switzerland

<sup>2</sup> KU Leuven, PRONTO Research Lab - Department of Development and Regeneration, Leuven, Belgium

<sup>3</sup> KU Leuven, Neurorehabilitation Research Group - Department of Rehabilitation Sciences, Leuven, Belgium

<sup>4</sup> KU Leuven, Department of Development and Regeneration, Leuven, Belgium

<sup>5</sup> UZ Leuven, Department of Orthopedics, Leuven, Belgium

## O 115 A novel botulinum toxin formula, which diminishes the adverse effects of BTX-A on muscular mechanics

*Çemre Su Kaya Keleş<sup>1,2</sup>, Can A. Yucesoy<sup>2</sup>*

<sup>1</sup> University of Stuttgart, Institute of Structural Mechanics and Dynamics in Aerospace Engineering, Stuttgart, Germany

<sup>2</sup> Boğaziçi University, Institute of Biomedical Engineering, Istanbul, Turkey

## Coffee Break

10:30–11:00

## Plenary Session:

### 18) Paediatric neurological disorders and syndromes

11:00–12:15, Hall A

Chairs: N Susan Stott (New Zealand), Per Reidar Hoiness (Norway)

#### O 116 Test-retest repeatability of a motorized ankle resistance measurement in children

*Ruoli Wang<sup>1</sup>, Alexandra Palmcrantz<sup>2,3</sup>, Antea Destro<sup>1</sup>, Zhibao Duan<sup>1</sup>, Cecilia Lidbeck<sup>2,4</sup>*

<sup>1</sup> Royal Institute of Technology - KTH, Promobilia MoveAbility Lab - Dept. of Mechanics - SCI, Stockholm, Sweden

<sup>2</sup> Karolinska Institutet, Department of Women's and Children's Health, Stockholm, Sweden

<sup>3</sup> Karolinska University Hospital, Functional Area Occupational Therapy & Physiotherapy, Stockholm, Sweden

<sup>4</sup> Karolinska University Hospital, Department of Pediatric Orthopaedic Surgery, Stockholm, Sweden

#### O 117 Investigation of gross motor function, balance, muscle structure, and spatiotemporal parameters of running in children with Down Syndrome

*Esra Kınacı Biber<sup>1</sup>, Abdullah Rubi Soylu<sup>2</sup>, Semra Topuz<sup>3</sup>, Akmer Mutlu<sup>1</sup>*

<sup>1</sup> Hacettepe University, Faculty of Physical Therapy and Rehabilitation - Developmental and Early Physiotherapy Unit, Ankara, Turkey

<sup>2</sup> Hacettepe University, Faculty of Medicine, Department of Biophysics, Ankara, Turkey

<sup>3</sup> Hacettepe University, Faculty of Physical Therapy and Rehabilitation - Movement Analysis Laboratory, Ankara, Turkey

#### O 118 Longitudinal trajectories of muscle strength deficits in growing boys with Duchenne muscular dystrophy

*Ines Vandekerckhove<sup>1</sup>, Marleen Van den Hauwe<sup>1,2</sup>, Tijl Dewit<sup>1,3</sup>, Geert Molenberghs<sup>4,5</sup>,*

*Nathalie Goemans<sup>2,6</sup>, Liesbeth De Waele<sup>2,6</sup>, Anja Van Campenhout<sup>6,7</sup>, Friedl De Grootte<sup>8</sup>,*

*Kaat Desloovere<sup>1,3</sup>*

<sup>1</sup> KU Leuven, Department of Rehabilitation Sciences, Leuven, Belgium

<sup>2</sup> University Hospital Leuven, Department of Child Neurology, Leuven, Belgium

<sup>3</sup> University Hospital Leuven, Clinical Motion Analysis Laboratory, Pellenberg, Belgium

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<sup>7</sup> University Hospital Leuven, Department of Orthopedics, Leuven, Belgium

<sup>8</sup> KU Leuven, Department of Movement Sciences, Leuven, Belgium

#### O 119 Sensory function of the foot and leg in children with arthrogyriposis and myelomeningocele

*Åsa Bartonek<sup>1</sup>, Mikael Reimeringer<sup>1</sup>, Marie Eriksson<sup>1</sup>*

<sup>1</sup> Karolinska Institutet, Women's and Children's Health, Stockholm, Sweden

**O 120 Idiopathic toe-walkers demonstrate multiplanar gait deviations compared to typically developed children voluntarily toe-walking**

*Halenu Evrendilek<sup>1,2,3</sup>, Julie Stebbins<sup>3,4</sup>, Alpesh Kothari<sup>3,4</sup>*

<sup>1</sup> *Istanbul Kultur University, Department of Physiotherapy and Rehabilitation, Istanbul, Turkey*

<sup>2</sup> *Istanbul University - Cerrahpaşa, Division of Physiotherapy and Rehabilitation, Istanbul, Turkey*

<sup>3</sup> *University of Oxford, Nuffield Department of Orthopaedics - Rheumatology and Musculoskeletal Sciences, Oxford, United Kingdom*

<sup>4</sup> *NHS, Oxford Gait Laboratory, Oxford, United Kingdom*

**O 121 German translation and cross-cultural comparison of a mobility questionnaire (MobQues47) for ambulant children and adolescents with cerebral palsy**

*Jacqueline Romkes<sup>1</sup>, Matthias Hös<sup>2</sup>, Annika Kruse<sup>3</sup>, Martin Sveblik<sup>4</sup>, Elke Viehweger<sup>5</sup>, Steffen Berweck<sup>6,7</sup>, Sean Nader<sup>8</sup>, Annemieke I. Buizer<sup>9,10</sup>, Helga Haberer<sup>11</sup>*

<sup>1</sup> *University of Basel Children's Hospital, Centre for Clinical Movement Analysis, Basel, Switzerland*

<sup>2</sup> *Schön Clinic Vogtareuth, Gait and Motion Analysis Laboratory, Vogtareuth, Germany*

<sup>3</sup> *University of Graz, Institute of Human Movement Science / Sport and Health, Graz, Austria*

<sup>4</sup> *Medical University of Graz, Department of Orthopaedics and Trauma, Graz, Austria*

<sup>5</sup> *University of Basel Children's Hospital, Neuro-Orthopaedic Department, Basel, Switzerland*

<sup>6</sup> *Ludwig-Maximilians-University of Munich, LMU Hospital / Department of Pediatrics, Munich, Germany*

<sup>7</sup> *Schön Clinic Vogtareuth, Specialist Centre for Paediatric Neurology / Neuro-Rehabilitation and Epileptology, Vogtareuth, Germany*

<sup>8</sup> *Schön Clinic Vogtareuth, Specialist Centre for Paediatric Orthopaedics / Neuro-Orthopaedics and Deformity Reconstruction, Vogtareuth, Germany*

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<sup>10</sup> *Amsterdam Movement Sciences, Rehabilitation & Development, Amsterdam, Netherlands*

<sup>11</sup> *KU Leuven Bruges, Department of Rehabilitation Medicine, Bruges, Belgium*

**Keynote Lecture 3:  
Reidun Birgitta Jahnsen**

*12:15–13:00, Hall A*

*Chair: Arve Opheim (Norway)*

**Movement is a living thing**

*Reidun Birgitta Jahnsen<sup>1</sup>*

<sup>1</sup> *University of Oslo, Institute of Health and Society, Department for Public Health Science and Epidemiology, Oslo, Norway*

**Awards & Closing Ceremony**

*13:00–13:30, Hall A*

# List of Posters

## Day 1 – Poster session

Topic groups 03, 07, 08, 09, 10, 13, 14, 18

### Group 03 Elderly

#### **P 001 Stair descent in older adults: Fall history and fear's effect on ankle kinematics**

*Cintia Elord Julio<sup>1</sup>, Silvio Antonio Garbelotti Junior<sup>2</sup>, Fernanda Colella Antonialli<sup>1</sup>, Adriane Mara de Souza Muniz<sup>3</sup>, Paulo Lucareli<sup>1</sup>*

<sup>1</sup> Nove de Julho University, Rehabilitation Science, São Paulo, Brazil

<sup>2</sup> Santa Marcelina Medical School, Department of Anatomy, São Paulo, Brazil

<sup>3</sup> Physical Education School of Brazilian Army, EsFEEx, Rio de Janeiro, Brazil

#### **P 002 Development of a locomotor sensory integration test in healthy young and older adults: A protocol study**

*Esmá Nur Kolbasi Dogan<sup>1</sup>, Lotte Janssens<sup>1</sup>, Joke Spildooren<sup>1</sup>, Pieter Meyns<sup>1</sup>*

<sup>1</sup> Hasselt University, REVAL Rehabilitation Research, Diepenbeek, Belgium

#### **P 003 Intrinsic capacity comparisons between fallers and non-fallers in Singaporean elderly population**

*Yixing Liu<sup>1</sup>, Kai Zhe Tan<sup>1,2</sup>, Sai G.S. Pai<sup>1</sup>, Preeti Gupta<sup>3,4</sup>, Ecosse Lamoureux<sup>3,4</sup>, Navrag Singh<sup>1,2</sup>*

<sup>1</sup> Singapore-ETH Center, Future Health Technologies, Singapore, Singapore

<sup>2</sup> ETH Zürich, 2 Institute for Biomechanics- Dept. of Health Sciences and Technology, Zürich, Switzerland

<sup>3</sup> Duke-NUS Medical School, Health Services and System Research, Singapore, Singapore

<sup>4</sup> The Academia, Singapore Eye Research Institute SERI, Singapore, Singapore

#### **P 004 Spatiotemporal parameters of older adults' outdoor walking on hilly and level terrains**

*Emmi Matikainen-Tervola<sup>1,2,3</sup>, Neil Cronin<sup>2,4</sup>, Eeva Aartolahti<sup>1</sup>, Sanna Sihvonen<sup>1</sup>, Sailee Sangsiri<sup>2</sup>, Taija Finni<sup>2</sup>, Olli-Pekka Mattila<sup>3</sup>, Merja Rantakokko<sup>1,3,5</sup>*

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**P 005 Impact of age-related characteristics in females on neuromuscular and motor control: Musculoskeletal modeling using OpenSim software**

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**P 006 Physical activity, neuropsychiatric symptoms, and physical function among nursing home residents: The HUNT-study**

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**P 007 Consistency of different functional mobility tests in older people with Parkinson's disease**

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**P 008 Distinguishing (pre)frail from non-frail older adults based on walking pattern: A Scoping Review on gait parameters derived from inertial sensors**

*Xin Zhang<sup>1</sup>, Li Feng<sup>2</sup>, Barbara Munster<sup>3</sup>, Hans Hobbelen<sup>4</sup>, Claudine JC Lamoth<sup>1</sup>*

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*Group 07 Movement analysis methodology*

**P 009 Objective assessment and understanding using machine learning algorithms: Application in individuals with Unilateral Trans-Tibial Amputation**

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**P 010** **Assessing two IMU-based gait event detection methods and their effect on spatiotemporal gait parameters across young and elderly populations**

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**P 011** **Comparison of lower-body 3D gait kinematics between Theia3D markerless and IOR and CGM marker-based models during pathological gait**

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**P 012** **The impact of initial contact events on kinematics in pathological gait – Preliminary results of an ongoing study**

*Bernhard Dumphart<sup>1</sup>, Djordje Slijepčević<sup>2</sup>, Fabian Unglaube<sup>3</sup>, Andreas Kranz<sup>3</sup>, Arnold Baca<sup>4</sup>, Brian Horsak<sup>5</sup>*

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**P 013** ☆ **Objective assessment in serious game rehabilitation: Hand kinematics via device tracking**

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**P 014** **Development of open science guidelines for movement laboratories**

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**P 015** ☆ **Changes in trunk and lower body gait kinematics in children following a Theia3D update**

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**P 016** **Midgait method for obtaining plantar pressure variables during overground walking at different self-selected speeds: A reliability study**

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**P 017** **Does walking toward and away from a markerless dual-camera system yield similar results?**

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**P 018** **The effect of active, augmented reality induced head movements on walking, mapped by spatiotemporal gait parameters in healthy adults**

*Eugénie Lambrecht<sup>1</sup>, David Beckwée<sup>1,2</sup>, Willem De Hertogh<sup>1</sup>, Luc Vereeck<sup>1</sup>, Ann Halleman<sup>1</sup>*

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**P 019** **Assessing the robustness of an optimization method for estimating muscle activity during gait: Preliminary findings**

*George Lisa<sup>1,2,3</sup>, Kim Kristin Peper<sup>4</sup>, Adam Park<sup>1</sup>, Thomas Grauschopf<sup>3</sup>, Veit Senner<sup>1</sup>, Sami Haddadin<sup>4</sup>*

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**P 020** ☆ **Knee joint kinematics with the new conventional gait model (CGM2): A comparison of inverse versus direct kinematics**

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**P 021 The effect of unilateral sensitive weight carrying on gait biomechanics**

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**P 022 Improved knee abduction moment prediction by incorporating tibial rotation into the knee abduction angle in single-leg squats with dynamic valgus**

*Harald Penasso<sup>1</sup>, Klaus Widhalm<sup>1</sup>, Sebastian Durstberger<sup>1</sup>*

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**P 023 Kinematic and kinetic parameters of prosthetic knee joints during walking – Comparison of gait analysis results and internal sensor data**

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**P 024 AI-driven single camera markerless gait analysis in Parkinson's disease for home-based rehabilitation: Reliability assessment**

*Giulio Rigoni<sup>1</sup>, Federica Cibin<sup>2</sup>, Niccolò Monaco<sup>2</sup>, Fabiola Spolaor<sup>1</sup>, Annamaria Guiotto<sup>1</sup>, Daniele Volpe<sup>3</sup>, Zimi Sawacha<sup>1</sup>*

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**P 025 Biomechanic pattern of knees after ACL reconstruction**

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**P 026 Assessment the feasibility of an AI model predicting lower extremity joint moments during walking in patients with cerebral palsy**

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**P 027** **Evaluating the relationship between muscle activities and joint moments during walking through a simple model**

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**P 028** **Sonification can alter Joint Alignment for Personalized Rehabilitation: Evidence from a Controlled Pilot Study**

*Mark Simonlehner<sup>1,2</sup>, Victor Adriel de Jesus Oliveira<sup>3</sup>, Kerstin Prock<sup>1,2</sup>, Michael Iber<sup>3</sup>, Brian Horsak<sup>1,2</sup>, Tarique Siragy<sup>2</sup>*

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**P 029** **Markerless capture of gait kinematics while walking with ankle-foot orthoses**

*Elza Van Duijnboven<sup>1,2</sup>, Koen Wishaupt<sup>1</sup>, Niels Waterval<sup>1,2</sup>, Merel-Anne Brehm<sup>1,2</sup>, Marjolein van der Krogt<sup>1,2</sup>*

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**P 030** **A video-based methodology for automated classification of dystonia and choreoathetosis in dyskinetic cerebral palsy during a lower extremity task**

*Helga Haberfehlner<sup>1</sup>, Zachary Roth<sup>2</sup>, Inti Vanmechelen<sup>1</sup>, Annemieke I. Buiizer<sup>3</sup>, Vermeulen R. Jeroen<sup>4</sup>, Anne Koy<sup>5</sup>, Jean-Marie Aerts<sup>6</sup>, Hans Hallez<sup>7</sup>, Monbaliu Elegast<sup>2</sup>*

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**P 031** **Novel ground reaction force-based parameters for monitoring rehabilitation in tibial fractures**

*Christian Wolff<sup>1,2</sup>, Elke Warmerdam<sup>3</sup>, Tim Dahmen<sup>1,4</sup>, Tim Poblemann<sup>5</sup>, Philipp Slusallek<sup>1</sup>, Bergita Gansse<sup>3,5</sup>*

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**P 032** **Glyph visualisation of physical examination measurements for clinical gait analysis to aid cognitive efficiency**

*Hong-Po Hsieh<sup>1</sup>, Min Chen<sup>1</sup>, Marian Harrington<sup>2</sup>, Andrew Lewis<sup>2</sup>, Amy Zavatsky<sup>1</sup>*

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**P 033** **How does the choice of reference frame impact the distribution of WBAM components around different anatomical axes?**

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*Group 08 Musculoskeletal disorders - general*

**P 034** **Unsupervised cluster approach to identify possible associations between phenotypes and gait motor control in children with Fragile x syndrome**

*Fabiola Spolaor<sup>1</sup>, Federica Begbetti<sup>2</sup>, Annamaria Guiotto<sup>3</sup>, Elisa DiGiorgio<sup>1</sup>, Valentina Liani<sup>1</sup>, Roberta Polli<sup>1</sup>, Giulio Rigoni<sup>2</sup>, Alessandra Murgia<sup>1</sup>, Zimi Sawacha<sup>2</sup>*

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**P 035** **Correlation between passive ankle dorsiflexion and gait parameters in idiopathic toe-walkers**

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**P 036** ☆ **Functional popliteal angle test for identification of hamstring muscle spasticity in patients with a central neurological lesion**

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**P 037** **Muscle thickness, muscle strength, and fitness in two young adults with moderate and severe spastic cerebral palsy**

*Ana Kunstic<sup>1</sup>, Linnéa Corell<sup>2</sup>, Nina Mosser<sup>1</sup>, Martin Sveblök<sup>3</sup>, Markus Tilp<sup>1</sup>, Mireille van Poppel<sup>1</sup>, Ferdinand von Walden<sup>2</sup>, Annika Kruse<sup>1</sup>*

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**P 038 Exploring gait spatiotemporal in chronic low back pain and healthy populations: A comparative study**

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**P 039 ☆ Gait analysis in children with Duchenne Muscular Dystrophy: Overground vs. Treadmill walking**

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**P 040 The relationship between chronic nonspecific low back pain intensity and postural sway during single and double leg standing**

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*Group 09 Musculoskeletal disorders - Spine, shoulder, hip, knee deformity*

**P 041 Investigating impact of unilateral and bilateral femoral anteversion on lower extremity parameters during walking in hypermobile children: A pilot study**

*Yeşim Karakurt<sup>1</sup>, Nazif Ekin Akalan<sup>2,3</sup>, Shavkat Kuchimov<sup>3</sup>, Kevser Burma<sup>1</sup>, Fuat Bilgili<sup>4</sup>*

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**P 042 Investigating the relationship between hamstring tightness-related gait parameters and femoral anteversion-based modified popliteal angle measurement in healthy individuals**

*Sıla Baran<sup>1</sup>, Enes Tekçe<sup>1</sup>, Ekin Akalan<sup>1,2</sup>, Keuser Burma<sup>3</sup>, Shavkat Nadir Kuchimov<sup>2,4</sup>*

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**P 043 Gait asymmetry in children with achondroplasia in comparison to a group of typically developed children**

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**P 044 Comparison of spine structure, mobility, and competency in subjects with and without Temporomandibular Joint Dysfunction Symptoms: A pilot study**

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**P 045 Walking and running of children with decreased femoral torsion are compared to each other**

*Britta K Krautwurst<sup>1</sup>, Christos Tsagkaris<sup>1</sup>, Marina Hamberg<sup>1</sup>, Christina Villefort<sup>1</sup>, Thomas Dreher<sup>1</sup>*

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**P 046 Linking pain and disability to kinematic deviations in subacromial shoulder pain**

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*Silvio A Garbelotti Jr<sup>2</sup>, João Carlos Ferrari Correa<sup>1</sup>, Gabor J Barton<sup>3</sup>, Paulo Lucareli<sup>1</sup>*

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**P 047 ☆ Movement Deviation Profile and pain intensity: Insights from three-dimensional gait analysis in women with patellofemoral pain**

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## P 048 Determining the kinematic gait alterations of lower extremity in individuals with mechanical low back pain

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### Group 10 Orthopedic problems - osteoarthritis and joint movement

## P 049 Can a single sensor measure hip range of motion in hip osteoarthritis patients?

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## P 050 Exploring gait patterns: Differences in knee force profiles among patients with knee osteoarthritis

*Morten Bilde Simonsen<sup>1,2</sup>, Jolas Elisa<sup>3</sup>, Stephanie Smith<sup>4</sup>, Martijn Steultjens<sup>5</sup>,*

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## P 051 Gait analysis technologies for biomechanical assessment in knee osteoarthritis: Understanding variability and distinctions

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## P 052 A footmounted sensor assesses the foot progression angle sufficiently accurate during walking when aiming to minimize knee load

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**P 053** **Effect of using the cane on muscle activity during walking with and without cane executed by knee osteoarthritis people**

*Meroeb Mohammadi<sup>1</sup>, Yaghoobi Seyedehghazal<sup>1</sup>, Sadra Aghapouri Afshari<sup>2</sup>, Maryam Namazifard<sup>3</sup>*

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**P 054** **Bracing for relief: The impact of knee brace design on gait in patellofemoral pain**

*Gabriel J Navarro<sup>1</sup>, Otávio HC Leite<sup>1</sup>, Leticia D Borges<sup>1</sup>, Diogo HM Gonçalves<sup>1</sup>, Paulo Lucareli<sup>1</sup>*

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**P 055** **Acute effects of artificially increased frontal plane projection angle on gait biomechanics in healthy subjects: A pilot study**

*Imge Nas<sup>1,2,3</sup>, Seda Ozdemir<sup>1</sup>, Kubra Onerge<sup>1,3,4</sup>, Nazif Ekin Akalan<sup>1,3</sup>, Shavkat Nadir Kuchimov<sup>3,5</sup>, Devrim Tarakci<sup>2</sup>*

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**P 056** **Evaluation the dynamic function of temporomandibular joint in patients with TMJ osteoarthritis**

*Jiejun Shi<sup>1</sup>, Na Wu<sup>1</sup>, Yitong Chen<sup>1</sup>, Chenyu Wang<sup>1</sup>, Shiyu Hu<sup>1</sup>*

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**P 057** **Gait analysis can distinguish patients with and without union of tibial shaft fractures as early as six weeks after surgery**

*Elke Warmerdam<sup>1</sup>, Marcel Orth<sup>2</sup>, Max Müller<sup>2</sup>, Tim Pobleman<sup>2</sup>, Bergita Ganse<sup>1</sup>*

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**P 058** **Associations with a positive Trendelenburg Test and adolescent Hip Dysplasia**

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**P 059** Effects of functional electrical stimulation (FES) on daily-living questionnaire outcomes in adult patients with upper motor neuron syndrome

*Niklas Bleichner<sup>1</sup>, Johanna Porr<sup>1</sup>, Leon Deboy<sup>1</sup>, Merkur Alimusaj<sup>1</sup>, Franke Nees<sup>2</sup>, Herta Flor<sup>3</sup>, Sebastian I. Wolf*

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**P 060** Symmetric gait with prosthetic and orthotic devices in children with congenital lower limb deficiencies

*Marie Eriksson<sup>1</sup>, Åsa Eliasson<sup>1</sup>, Eva Pontén<sup>1</sup>, Mikael Reimeringer<sup>1</sup>, Åsa Bartonek<sup>1</sup>*

<sup>1</sup> *Karolinska Institutet, Women's and Children's Health, Stockholm, Sweden*

**P 061** Inter-session and inter-rater variability in biomechanical gait parameters for a single subject: Preliminary results of a multicenter study

*Michael Ernst<sup>1</sup>, Eva Pröbsting<sup>1</sup>, Veit Schopper<sup>1,2</sup>, Thomas Schmalz<sup>1</sup>, Barbara Pobatschnig<sup>1</sup>, Ursula Trinle<sup>3</sup>, Harald Böhm<sup>4,5</sup>, Bellmann Malte<sup>1,4</sup>*

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**P 062** Practices in providing Ankle Foot Orthoses to Children with Cerebral Palsy in Norway

*Tobias Gøihl<sup>1</sup>, David Rusaw<sup>2</sup>, Karin Roeleveld<sup>3</sup>, Siri Merete Brendvik<sup>3</sup>*

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**P 063** Variation in spatiotemporal parameters and DoA of gait between transtibial and transfemoral amputees : A single centre study

*Mobd Zainizam Abdull Rasid<sup>1</sup>, Mazehi Nazrin<sup>1</sup>, Batrisyia Omar<sup>1</sup>, Nurbazalina Rosley<sup>1</sup>, Tan Eng Wab<sup>1</sup>, Hazreen Haizi Harith<sup>2</sup>, Haidzir Manaf<sup>3</sup>, Saiful Adli Bukry<sup>3</sup>, Hafez Hussain<sup>1</sup>, Azlan Shapie<sup>4</sup>*

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**P 064** **Effects of gait variability training following ankle-foot-orthosis provision in three individuals with bilateral calf muscle weakness due to neuromuscular disorders**

*Elza Van Duijnhoven<sup>1,2</sup>, Bart Raijmakers<sup>1,2</sup>, Fieke Sophia Koopman<sup>1,2</sup>, Frans Nollet<sup>1,2</sup>, Katinka van der Kooij<sup>3</sup>, Merel-Anne Brehm<sup>1,2</sup>, Niels Waterval<sup>1,2</sup>*

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**P 065** **Designing sensor-equipped insoles for Diabetic Foot and investigation of its usability**

*Yasemin Yarbaş<sup>1</sup>, Fuat Bilgili<sup>2</sup>, Ali Fuat Ergenç<sup>3</sup>, Gaye Torna<sup>4</sup>, Nurdan Güf, Betül Yiğit Yalçın<sup>5</sup>, İlhan Satman<sup>5</sup>*

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*Group 14 Robotic and assistive devices*

**P 066** **A review on the implementation of lower-limb exoskeletons to improve the intrinsic capacity and functional ability of older adults**

*Rebeca Gavrila Laic<sup>1</sup>, Mabyar Firouzi<sup>1</sup>, Reinhard Clacys<sup>1</sup>, Ivan Bautmans<sup>2</sup>, Eva Swinnen<sup>1</sup>, David Beckwé<sup>1</sup>*

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**P 067** **Functional electrical stimulation for the recovery of dorsiflexion during early rehabilitation after stroke**

*Axel Fredriksen<sup>1</sup>, Xiaochen Zhang<sup>2</sup>, Lanie Gutierrez-Farewik<sup>2,3</sup>, Susanne Palmcrantz<sup>1</sup>*

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**P 068 Neuromuscular disparities between amputee walking gait with crutches and healthy gait for lower extremities**

*Tannaz Taassob<sup>1</sup>, Mohammad Yasin Amani<sup>2</sup>, Navid Jamshidzadeh<sup>3</sup>, Elnaz Abedini<sup>4</sup>, Meroeb Mohammadi<sup>5</sup>, Armaghan Sabouri<sup>3</sup>, Fatemeh Rasuli Samar<sup>5</sup>, Hannaneh Faraji<sup>1</sup>*

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**P 069 The impact of cycling on the physical and mental health of people with disabilities**

*Nina Mosser<sup>1</sup>, Glen Norcliff<sup>2</sup>, Annika Kruse<sup>1</sup>*

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**P 070 Effects of the Exopulse Mollii suit on spasticity and gait in spinal cord injury**

*Jia Min Yen<sup>1</sup>, Nur Shafawati Kamsani<sup>2</sup>, Ning Tang<sup>1</sup>, Hua Sen Lai<sup>1</sup>, Jiun Shiah Low<sup>3</sup>, Effie Chew<sup>1</sup>*

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**P 071 Feasibility of a new soft ankle exoskeleton on people with dropfoot post-stroke**

*Xiaochen Zhang<sup>1</sup>, Lanie Gutierrez-Farewik<sup>1,2</sup>, Susanne Palmcrantz<sup>3</sup>*

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*Group 18 Clinical reasoning and evidence*

**P 072 Cluster analysis to identify the most prominent gait patterns in children with torsional deformities**

*Nathalie Alexander<sup>1</sup>, Johannes Cip<sup>2</sup>, Harald Lengnick<sup>2</sup>, Florian Dobler<sup>1</sup>*

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**P 073** **3D-Gait-analysis and patient reported outcome measures before and one year after femoral derotational osteotomy in adolescents with increased femoral anteversion**

*Anders Grønseth<sup>1</sup>, Johansson Anna Marie<sup>2</sup>, Stine Hanssen<sup>2</sup>, Joachim Horn<sup>1</sup>*

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**P 074** **The effect of lower-body positive-pressure treadmill training in early rehabilitation for patients with lower extremity fractures**

*Heeyoune Jung<sup>1</sup>, Suk-ko Hong<sup>1</sup>*

<sup>1</sup> *National Traffic Injury Rehabilitation Hospital, Rehabilitation Medicine, Yangpyeong, Republic of Korea*

**P 075** **The effect of vibrotactile training on gait biomechanics in children with idiopathic toe walking**

*Zeynep Boncuk<sup>1</sup>, Kubra Onerge<sup>1,2,3</sup>, Burcu Semin Akel<sup>1,3</sup>, Nazif Ekin Akalan<sup>1,3</sup>, Fuat Bilgili<sup>4</sup>*

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## Day 2 – Poster session

*Topic groups 01, 02, 04, 05, 06, 11, 12, 15, 16, 17, 19*

### *Group 01 Adult neurological disorders*

**P 076** **Visual perturbation training reduces visual dependency and improves gait in people with Parkinson's disease**

*Remco Baggen<sup>1</sup>, Anke Van Bladel<sup>1</sup>, Maarten Prins<sup>2</sup>, Jennifer Stappers<sup>1</sup>, Katie Bouche<sup>3</sup>, Leen Maes<sup>1</sup>, Miet De Letter<sup>1</sup>, Dirk Cambier<sup>1</sup>, Patrick Santens<sup>4</sup>*

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**P 077** **Evaluation of complex gait features using an accelerometer-based method in advanced Parkinson's disease**

*Mohamed Boutaayamou<sup>1</sup>, Eric Parmentier<sup>2</sup>, Cédric Schwartz<sup>1</sup>, Olivier Brûls<sup>1</sup>, Gaëtan Garraux<sup>2</sup>*

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**P 078** ☆ **Modeling self-reported mobility in Parkinson's Disease through sensor-derived gait parameters**

*Alan Castro Mejia<sup>1,2</sup>, Stefano Sapienza<sup>1,2</sup>, Patricia Martins Conde<sup>1,2</sup>, Lukas Pavelka<sup>1,3,4</sup>, Rejko Krueger<sup>1,3,4,5</sup>, Jochen Klucken<sup>1,2,6</sup>*

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<sup>6</sup> Centre Hospitalier de Luxembourg, Digital Medicine, Luxembourg, Luxembourg

**P 079** **Longitudinal effects of stroke rehabilitation: A new deep learning method on joint angle latent space**

*Aske Gye Larsen<sup>1</sup>, Mirjam Pijnappels<sup>2</sup>, Karin Gerrits<sup>2</sup>, Sina David<sup>1</sup>*

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**P 080** **Effects of gait training using hybrid assistive limb on spatiotemporal gait parameters among stroke survivors: A single-arm pilot study**

*Haidzir Manaf<sup>1</sup>, Nazrin Mabezi<sup>2</sup>, Mohamad Azlan Mohamed Shapie<sup>3</sup>, Zainizam Rasid<sup>2</sup>, Nurhazalina Rosley<sup>2</sup>, Eng Wab Tan<sup>2</sup>, Hafez Hussain<sup>2</sup>, Saiful Adli Bukry<sup>1</sup>, Hafifi Hisham<sup>4</sup>*

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**P 081** **Comparison of gait-domains between freezers and non-freezers in Parkinson's disease**

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**P 082** ☆ **Effects of treadmill and virtual reality gait training on the quality of life of people with Parkinson's disease**

*Gileno Melo<sup>1,2</sup>, Jose Roberto Zaffalon Junior<sup>3</sup>, Jamile BP Lopes<sup>1</sup>, Natália A C Duarte<sup>1</sup>, Deise A P Oliveira<sup>1</sup>, Leonardo P Rezende<sup>4</sup>, Pedro Augusto<sup>1</sup>, Luanda C Grecco<sup>1</sup>, Verónica Cimolin<sup>5</sup>, Claudia Oliveira<sup>1,6</sup>*

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**P 083 Assessing the impact of a rehabilitation treatment with exoskeleton on gait and posture of Parkinson's disease individuals**

*Fabiola Spolaor<sup>1</sup>, Marco Romanato<sup>1</sup>, Elena Pegolo<sup>1</sup>, Fulvia Fichera<sup>2</sup>, Giulio Rigoni<sup>1</sup>, Annamaria Guiotto<sup>1</sup>, Daniele Volpe<sup>2</sup>, Zimi Sawacha<sup>1</sup>*

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*Group 02 Coordination and motor control*

**P 084 The effects of attentional focus instructions on biomechanical parameters of single-leg drop-landing**

*Fatemeh Alaei<sup>1</sup>, Zdenek Svoboda<sup>1</sup>, Reza Abdollahipour<sup>1</sup>, Javad Sarvestan<sup>2</sup>, Hana Chlebničková<sup>1</sup>*

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<sup>2</sup> University of Calgary, Department of Biomedical Engineering, Calgary, Canada

**P 085 To Switch or not to Switch: Leg-preference Consistency and Motor Ability in 7-year-old children**

*Osnat Atun-Einy<sup>1</sup>, Inna Farkash<sup>1</sup>*

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**P 086 Motor control in children with cerebral palsy during walking on flat and uneven ground compared to typically developing children**

*Linda Bühl<sup>1,2</sup>, Morgan Sangeux<sup>1,2</sup>, Heide Elke Viehweger<sup>1,2</sup>, Jacqueline Romkes<sup>1</sup>, Michele Widmer<sup>1</sup>, Katrin Bracht-Schweizer<sup>1</sup>*

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**P 087 Pilot evaluation of changes in motor control after a CrossFit® intervention in adolescents with unilateral cerebral palsy**

*Linda Bühl<sup>1,2</sup>, Jacqueline Romkes<sup>1</sup>, Morgan Sangeux<sup>1,2</sup>, Heide Elke Viehweger<sup>2</sup>, Michèle Widmer<sup>1</sup>*

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**P 088 Soleus H-reflex modulation during split-belt walking in healthy young adults: Preliminary results**

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**P 089 Effect of short walking exercise on gait kinematic in adults with Type 1 Muscular Dystrophy**

*Barthélémy Hoerter<sup>1,2</sup>, Yosra Cherni<sup>1,2</sup>, Madia Hussainyar<sup>2,3</sup>, Bader Zaidan<sup>2,3</sup>, Laurent Ballaz<sup>2,3</sup>*

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**P 090 The effects of virtual reality on muscle synergies during walking and balancing in healthy adults**

*Johannes Eichwalder<sup>1</sup>, Paul Kaufmann<sup>1</sup>, Thomas Mandl<sup>2</sup>, Brian Horsak<sup>3</sup>, Hans Kainz<sup>1</sup>*

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**P 091 Can we walk smoothly on irregular surfaces: Insights from outdoor wearable sensor analysis**

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**P 092 Assessing dynamic stability in children with idiopathic toe walking in overground walking**

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**P 093 Psychological stress affects trial-to-trial variability of temporal-spatial gait parameters, but not of muscle synergy activation coefficients**

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**P 094 Impact of age on the cortical processing of postural sway**

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**P 095 Subthreshold TMS induced supraspinal modulation of spinal excitability in children and adolescents**

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**P 096 The role of selective motor control in single-leg standing biomechanics for children with cerebral palsy**

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**P 097 ☆ Understanding the impact of an early visual impairment on body-midline crossing skills while reaching for objects at the side**

*Stefania Petri<sup>1</sup>, Walter Setti<sup>1</sup>, Claudio Campus<sup>1</sup>, Helene Vitali<sup>1</sup>, Sabrina Signorini<sup>2</sup>,*

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**P 098 Effects of tDCS Associated with Proprioceptive Exercises on Postural Control in Individuals with Total Blindness**

*Rodolfo B Parreira<sup>1</sup>, Roberta C Toledo<sup>1</sup>, Deborah C S Cardoso<sup>1</sup>, Gabrielly R C Silva<sup>2</sup>,*

*Carvalho P Milena C<sup>2</sup>, Giovana L Silva<sup>2</sup>, Iransé O Silva<sup>1</sup>, Manuela Galli<sup>3</sup>, Veronica Cimolin<sup>3</sup>,*

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**P 099 The development of a clinical method to assess the Sensorimotor Control of the upper limbs using Pressure Mapping**

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**P 100 Speed-dependent changes in spatiotemporal gait parameters and margins of stability in response to optic flow perturbation in healthy young adults**

*Chunchun Wu<sup>1</sup>, Tom J.W. Buurke<sup>1,2</sup>, Rob den Otter<sup>1</sup>, Claudine J.C. Lamothe<sup>1</sup>, Menno P. Veldman<sup>1</sup>*

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**P101 Activity of the abductor hallucis muscle during level walking**

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**P102 The effect of sportive Latin American ballroom dance on foot and ankle posture**

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**P103 Comparison of postural stability during static and dynamic tasks between young adults with flexible flatfoot and normal foot posture**

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**P104 How wearing high-heel shoes changes muscle activation for young female: Comparison between barefoot and high-heel shoe walking gate**

*Seydehghazal Yaghoobi<sup>1</sup>, Setayesh Asadollahi<sup>2</sup>, Mostafa Mohamadi azizabadi<sup>3</sup>,*

*Rezvaneh Hajibahrami<sup>2</sup>, Meroeh Mohammadi<sup>4</sup>*

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**P105 Effect of the anterior weight-bearing lunge on the anterior tibiofibular gap in healthy adults**

*Tsubasa Tashiro<sup>1</sup>, Noriaki Maeda<sup>1</sup>, Shogo Tsutsumi<sup>2</sup>, Takeru Abekura<sup>1</sup>, Sakura Oda<sup>1</sup>,*

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## Group 05 Imaging and anatomy

### P106 Correlation between brain microstructural white matter integrity and qualitative gait outcome after stroke: A research protocol

*Renata Loureiro Chaves<sup>1</sup>, Amber van Hinsberg<sup>1</sup>, Cathy Stinear<sup>2</sup>, Laetitia Yperzeel<sup>3</sup>, Wim Saeys<sup>1</sup>, Steven Truijten<sup>1</sup>*

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### P107 Dynamic behavior of the gastrocnemius medialis during functional power exercises in typically developing children

*Babette Mooijekind<sup>1,2,3</sup>, Marjolein M. van der Krogt<sup>1,2</sup>, Liesbeth F. van Vulpen<sup>4</sup>, Francesco Cenni<sup>5</sup>, Alberto Botter<sup>6</sup>, Elena Cesti<sup>6</sup>, Annemieke I. Buizer<sup>1,2,7</sup>, Lynn Bar-On<sup>3</sup>*

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### P108 Radiographic adaptation of subjects with adolescent idiopathic scoliosis between the standing and sitting positions

*Emmanuelle Wakim<sup>1</sup>, Maria Asmar<sup>1</sup>, Maria Karam<sup>1</sup>, Abir Massaad<sup>1</sup>, Mohamad Karam<sup>1</sup>, Georges El Haddad<sup>1</sup>, Marc Boutros<sup>1</sup>, Ismat Ghanem<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Ayman Assi<sup>1,2</sup>*

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## Group 06 Modelling and simulation

### P109 Predicting neuromuscular control patterns that minimize ACL forces for injury prevention: Proof of concept on a muscle-driven 6DOF knee model

*Maria Dalle Vacche<sup>1</sup>, Giulio Rigoni<sup>1</sup>, Davide Pavan<sup>1</sup>, Annamaria Guiotto<sup>1</sup>, Fabiola Spolaor<sup>1</sup>, Zimi Sawacha<sup>1</sup>*

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**P110 Neck neuromuscular adaptation in various directions and magnitudes of head kicks in taekwondo: Musculoskeletal modeling using OpenSim**

*Siavash Kaviani Kosarkhizi<sup>1</sup>, Neda Boroushak<sup>2</sup>, Mohadeseh sadat Nabavi<sup>3</sup>, Meroeb Mohammadi<sup>3</sup>*

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**P111 Modeling the effects of common types of arm swing on muscle forces of the hip and knee joints**

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**P112 How deep muscle activation is affected during cycling: A musculoskeletal simulation study**

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*Group 11 Normative studies*

**P113 The Movement Deviation Profile gives a speed-matched measure of gait deviation**

*Jacob Beesley<sup>1</sup>, Hannah Shepherd<sup>2</sup>, Mark Robinson<sup>1</sup>, Henrike Greaves<sup>1</sup>, Milad Khedr<sup>3</sup>, Gabor Barton<sup>1</sup>*

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*Group 12 Paediatric neurological disorders*

**P114 Treatment of idiopathic toe walkers with TurtleBraces®: A comparison of biomechanical outcomes between pre-and post-treatment**

*Julie Basset<sup>1</sup>, Camille Costa<sup>1,2,3</sup>, Marianne Gagnon<sup>1,4</sup>, Katerina Jirasek<sup>1</sup>, Jean-François Girouard<sup>1</sup>, Reggie Charles Hamdy<sup>1,4</sup>, Louis-Nicolas Veilleux<sup>1,4</sup>*

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**P115** **Serious Game in Children with Unilateral Spastic Cerebral Palsy and Equinus Gait: Muscle shortening prevalence on the spasticity**

*Christophe Boulay<sup>1</sup>, Jean-Michel Gracies<sup>2</sup>, Lauren Garcia<sup>1</sup>, Guillaume Authier<sup>1</sup>, Alexis Ulian<sup>1</sup>, Taian Vieira<sup>3</sup>, Talita Pinto<sup>4</sup>, Marco Gazzoni<sup>3</sup>, Bernard Paratte<sup>1</sup>, Sébastien Pesenti<sup>1</sup>*

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**P116** **Spine kinematics during gait in children with Hereditary Spastic Paraparesis**

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**P117** ☆ **Ecological spatial exploration: Preliminary data about motor behaviors of children with visual impairments**

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**P118** **Hip and ankle proprioception affects balance performance in children with cerebral palsy: A case-control study**

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**P119** **The relation between macro- and microscopic muscle size parameters of the medial gastrocnemius in children with spastic cerebral palsy**

*Charlotte Lambrechts<sup>1</sup>, Jorieke Deschrevel<sup>1</sup>, Karen Maes<sup>2</sup>, Anke Andries<sup>2</sup>, Nathalie De Beukelaer<sup>1,3</sup>, Britta Hanssen<sup>1,4</sup>, Ines Vandekerckhove<sup>1</sup>, Anja Van Campenbout<sup>5,6</sup>, Ghislaine Gayan-Ramirez<sup>2</sup>, Kaat Desloovere<sup>1,7</sup>*

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- P 120** “Foot posture, function and alignment”, a continuing theme in children post SDR surgery?  
*Lucy Lecount<sup>1</sup>*  
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- P 121** Exploring scooting: Insights from a Delphi Panel on a distinctive walking pattern in children using posterior walkers  
*Samuel Oliver<sup>1</sup>, Caroline Stewart<sup>1</sup>*  
<sup>1</sup> *Robert Jones & Agnes Hunt NHS FT, Ortbotic Research and Locomotor Assessment Unit ORLAU, Oswestry, United Kingdom*
- P 122** Wearable sensors approach to quantify tip-toe behaviour in children and pre-adolescents with autism spectrum disorders: A pilot study  
*Giulia Purpura<sup>1</sup>, Martina Boccotti<sup>2</sup>, Luca Emanuele Molteni<sup>3</sup>, Giuseppe Andreoni<sup>4</sup>, Daniele Piscitelli<sup>1</sup>, Cecilia Perin<sup>1</sup>, Enzo Grossi<sup>2</sup>, Giulio Valagussa<sup>1</sup>*  
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- P 123** Characterizing adaptation capacity during split-belt walking among children with cerebral palsy  
*Alyssa Spomer<sup>1</sup>, Andrew Ries<sup>2</sup>, Zachary Lerner<sup>3</sup>, Katherine Steele<sup>4</sup>, Michael Schwartz<sup>2</sup>*  
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- P 124** Study protocol to assess effects of fatigue on gait in children and adolescents with cerebral palsy  
*Christian Von Deimling<sup>1</sup>, Isabell Lückoff<sup>1</sup>, Johannes Scherr<sup>2</sup>, Silvio Catuogno<sup>2</sup>, Nicole Mettler<sup>2</sup>, Thomas Dreher<sup>1</sup>, Britta Krautwurst<sup>1</sup>*  
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- P 125** An in vivo evaluation of skeletal muscle volume of preterm infants at term equivalent and at 3 months corrected age  
*Sian Williams<sup>1,2</sup>, Malcolm Battin<sup>3</sup>, Randika Perera<sup>4</sup>, Geoffrey Handsfield<sup>4</sup>, Amy Mulqueeney<sup>3</sup>, Ali Mirjalili<sup>5</sup>, N Susan Stott<sup>6</sup>*  
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## P 126 Ambulatory performance in children with hereditary Spastic Paraplegia

*Lane Wimberly<sup>1</sup>, Fabiola Reyes<sup>2</sup>, Kelly Jeans<sup>3</sup>, Elizabeth Bunkell<sup>4</sup>, Linsley Smith<sup>5</sup>*

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### Group 15 Sports and sports injury

## P 127 The effects of reducing hip internal rotation on jumping performance and jump biomechanics in volleyball players with flexible pes planus

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## P 128 Countermovement jump reveals decreased functional outcome despite subjective improvement after ACL reconstruction

*Zachary Flabaut<sup>1,2</sup>, Kevin K. Romanick<sup>3</sup>, Kenneth Brent Smale<sup>3</sup>, Teresa E. Flaxman<sup>2</sup>, Tine Alkjaer<sup>4,5</sup>, Erik B. Simonsen<sup>6</sup>, Michael R. Krosgaard<sup>7</sup>, Daniel L. Benoit<sup>8</sup>*

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## P 129 The acute effects of insoles on jumping performance and lower extremity biomechanics in volleyball players with flexible pes planus

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## P130 Static and dynamic balance of female figure skaters

*Jana Krizanova*<sup>1</sup>

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## P131 The interaction between biomechanical variables and oxygen consumption during running

*Otávio Henrique Cardoso Leite*<sup>1</sup>, *Danilo Prado*<sup>2</sup>, *Nayra DA Rabelo*<sup>1</sup>, *Gabor J Barton*<sup>3</sup>, *Luiz Hespanhol*<sup>4,5</sup>, *Paulo Lucareli*<sup>1</sup>

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## P132 Investigating upper-body muscle activation in different hand rotation angles during push-up variants using OpenSim Musculoskeletal Modeling

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## P133 Knee joint contact load associated by balance control for stance leg during taekwondo front kick: A musculoskeletal modeling approach

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**P 134**    **The effect of arm swing during countermovement jump in pes planus athletes**

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**P 135**    **Effects of mild hyperbaric oxygen therapy for running performance in junior male athletes**

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**P 136**    **How cycling in different power changes muscle-driven activation during pedaling phases**

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**P 137**    **Effect of cycling power output on neuromuscular activation of biarticular muscles**

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*Group 16 Stability and fall risk*

**P 138**    **Effects of bed height on rescuer's centre of pressure kinematics during chest compressions performed during cardiopulmonary resuscitation: Preliminary results**

*Maria Bhudarally<sup>1</sup>, Tiago Atalaia<sup>2</sup>, João Guerra<sup>3</sup>, João Abrantes<sup>3</sup>, Pedro Aleixo<sup>4</sup>*

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**P 139**    **Gait stability estimation using a common bodytracking-system in older adults**

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**P 140** **Augmented reality induced gait and postural balance perturbations in fallers and non-fallers: A multisensory approach**

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**P 141** **Sagittal malalignment in patients with adult spinal deformity seems to increase frontal instability during gait**

*Georges El Haddad<sup>1</sup>, Marc Boutros<sup>1</sup>, Rami Rachkidi<sup>1</sup>, Maria Asmar<sup>1</sup>, Maria Karam<sup>1</sup>,*

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*Group 16 Stability and fall risk*

**P 142** **The effectiveness of home-based video-game balance-training on gait stability in children with cerebral palsy**

*Pieter Mcyns<sup>1</sup>, Chloé Bras<sup>2</sup>, Laura van de Pol<sup>3</sup>, Annemieke Buizer<sup>4</sup>*

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**P 143** **Exploring the role of Auditory Stimuli in Manipulating Center of Mass Sway**

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**P 144** **How should we shape clinical balance analysis**

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**P 145** **Mediolateral margin of stability is larger in older than younger adults during the single-support phase**

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**P146 Influence of increased femoral anteversion on the trunk and pelvic kinematics during gait in hypermobile children**

*Kevser Burma<sup>1</sup>, Nazif Ekin Akalan<sup>2,3</sup>, Shavkat Kuchimov<sup>3</sup>, Adnan Apti<sup>2,3</sup>, Kübra Önerge<sup>2,3</sup>, Fuat Bilgili<sup>4</sup>*

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**P147 Test-retest reliability and level of agreement in kinematic variables during a standardized drinking task in adults with unilateral CP**

*Camilla Aksdal<sup>1</sup>, Linda Rennie<sup>2</sup>, Vivien Jorgensen<sup>3</sup>, Arve Opheim<sup>4</sup>*

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**P148 Neuromuscular control of neck muscles by the CNS in different head postures: A musculoskeletal modeling study using OpenSim software**

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**P149 Relationship between manual ability, dystonia and choreoathetosis and upper limb movement patterns during reaching and grasping in dyskinetic cerebral palsy**

*Inti Vanmechelen<sup>1</sup>, Helga Haberehner<sup>2</sup>, Brian H.M. Marten<sup>3</sup>, Jeroen Vermeulen<sup>3</sup>, Annemieke Buizer A.I.<sup>4</sup>, Kaat Desloovere<sup>5</sup>, Jean-Marie Aerts<sup>6</sup>, Hilde Feys<sup>7</sup>, Elegast Monbaliu<sup>8</sup>*

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**P150** Transforming our understanding of patient mobility in the community through wearable, invisible and inexpensive technology

*Joshua Hosking<sup>1</sup>, Jonathan Noble<sup>1</sup>, Adam Shortland<sup>1</sup>*

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**P151** Relationship between physical activity metrics and Late Life Function and Disability Instrument (LLFDI) among Proximal Femoral Fracture cohort: MobiliseD dataset

*Hananeh Younesian<sup>1</sup>, David Singleton<sup>1</sup>, Beatrix Vereijken<sup>2</sup>, Jorunn L. Helbostad<sup>2</sup>, Carl-Philipp Jansen<sup>3</sup>, Anisoara Ionescu<sup>4</sup>, Clemens Becker<sup>3</sup>, Brian Caulfield<sup>1</sup>*

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