

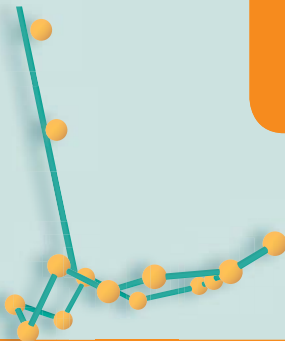


Heidelberg Marketing GmbH

24th Annual Meeting of the ESMAC & Pre-Congress

10–12 September 2015
Heidelberg, Germany

Pre-Congress | 7–9 September 2015



www.esmac2015.com



SEVILLE 2016

25TH ESMAC
ANNUAL MEETING
SEPT. 26TH – OCT. 1ST 2016

Announcement of the Conference ESMAC Seville 2016

We are delighted to invite you to the 25th Annual ESMAC Meeting 2016 from 26 September to October 1st in Seville, Spain.

The Pre Congress will take place from 26-28 September 2016.

The Main Congress will take place from 29 September to October 1st .

A great opportunity for researchers and clinicians to meet in one of the most monumental and beautiful cities in Europe.

The abstract submission starts January 11, 2016 and ends on April 17.

It will be a pleasure to meet you in Seville!

Kind regards

Ángela Tatay

President
Orthopaedic Surgery and Traumatology
Virgen del Rocío University Hospital



European Society for Movement Analysis in Adults and Children

www.esmac2016.com



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Dear colleagues, members and friends,

We cordially invite you to the **24th Annual ESMAC Meeting** in Heidelberg – for the 2nd time in this romantic city after 1999. The senior scientists may refresh their memories; the young researchers may lose their heart in this beautiful place.

In any case, this multidisciplinary event will provide an enjoyable and enriching forum for researchers and clinicians to meet. It is intended for all those interested in the clinical and technical aspects of human movement analysis.

While the **Main Congress** will take place in the heart of the old town at the Neue Universität (Heidelberg University), the **Pre-Congress** with courses and seminars will be held in our Orthopaedic Centre. The doors will be open to see all aspects of orthopaedic treatment from surgery to orthotics and prosthetics, and of course motion analysis.

We are looking forward to fruitful collaboration and a successful congress and to welcoming you to Heidelberg in 2015.



Thomas Dreher



Sebastian Wolf

Dear attendees of the Annual ESMAC Meeting,

ESMAC – the European Society for Movement Analysis in Adults and Children – will hold its 24th Annual Meeting in Heidelberg from 10 to 12 September 2015. This will be the second time the scientists of the European Society for Movement Analysis in Adults and Children, which was founded in 1992, will meet in our city. I am very pleased with this. Choosing Heidelberg once again as a venue on the one hand clearly proves that a visit to our beautiful city is always worthwhile and, on the other hand, means that Heidelberg is recognised as a leading city of science – above all in the field of medical research and teaching – which always provides the right framework for scientific conferences.

ESMAC's target and the purpose of the annual meeting of its members is to exchange new findings and ideas on movement analysis in adults and children. The exchange of theoretical knowledge in the premises of the New University will focus above all on aspects of biomechanics and on the clinical study of human movement processes. It will be complemented by courses and seminars at the Orthopaedic University Hospital where the orthopaedic treatment including operations and the manufacture of prostheses takes place. Heidelberg University Hospital is one of the most recognised centres for medical treatment, research and teaching in Europe.

Therefore the ESMAC Annual Meeting makes a significant contribution to strengthening Heidelberg's importance as a business location and its leading position in the field of life sciences. In the name of all Heidelberg citizens I would like to very warmly welcome the participants of the 24th Annual Meeting of ESMAC and wish you all a pleasant and stimulating stay in our city that would love to be your host in the future as well.



Dr. Eckart Würzner
Mayor of Heidelberg

Timetable

Time	Monday, 7 Sept 2015	Tuesday, 8 Sept 2015	Wednesday, 9 Sept 2015
8:30			
9:00	Gait Course	Gait Course	Gait Course
10:00	Coffee	Coffee	Coffee
10:30	Gait Course	Coffee	Coffee
11:00	Gait Course	Seminar 1 (continued)	Gait Course
12:30	Lunch	Lunch	Lunch
13:00		Lunch	Lunch
13:30	Gait Course	Gait Course	Gait Course
14:00	Gait Course	Seminar 2 Crouch Gait	Gait Course
15:00	Coffee	Coffee	Coffee
15:30	Gait Course	Coffee	Coffee
16:00	Gait Course	Seminar 2 (continued)	Gait Course
17:00	End Course Day 1		Seminar 4 Visualisation of Gait
17:30		End Course/Seminars Day 2	Seminar 5 Upper Extremity
18:00			Seminar 4 (continued)
			Seminar 5 (continued)
			Get Together

Gait Course

The ESMAC Gait Course provides a comprehensive overview of clinical gait analysis to those who are relatively new to the field. Participants will gain an understanding of normal walking gait, and learn how to describe this in a systematic way. Different elements of three-dimensional, instrumented gait analysis will be covered in-depth, including kinematics, kinetics and electromyography. Real, clinical cases will be used to demonstrate how to interpret this data, as well as relating the findings back to clinical examination and patient history. In addition, topics such as gait analysis equipment and trouble-shooting in the gait lab, will equip participants to gain valuable knowledge in assessing the validity of gait data. The course will be comprised of a mixture of lectures and inter-active workshops. Participants will also have the opportunity to collect gait data in a clinical gait laboratory. The faculty includes engineers, physiotherapists and orthopaedic surgeons, all experienced in the field of clinical gait analysis.

Faculty

Kaat Desloovere
Thomas Dreher
Martin Gough
Bertram Müller
Neil Postans
Andrew Roberts
Julie Stebbins
Sebastian Wolf

Tuesday, 8 September 2015, 09:00–13:00 h

Seminar 1 A clinician's guide to musculoskeletal modelling and simulation

Chair: Richard Baker, Marjolein van der Krogt

Intended for: Clinicians (PTs, Physicians, Orthotists and Prothesists)

Not sure what the difference is between inverse and forward dynamics? Confused by cost functions and boundary conditions? This seminar aims to describe state of the art in musculoskeletal modelling and simulation in a language that is comprehensible to clinicians with only a basic understanding of biomechanics.

At the end of the seminar you should be able to:

- Explain the basic terminology used in relation to musculoskeletal modelling and simulation
- Describe the major achievements in this field over the last twenty years
- Understand the limitations of these techniques
- Appreciate what developments are likely in the foreseeable future

Many biomechanists spend a lot of time dealing with the details and complexities of specific aspects of modelling and simulation and may also benefit from an opportunity to reflect on a simplified overview of what has been achieved and where the field is heading.

Timetable

Part 1: What are modelling and simulation?

Part 2: Muscle lengths and moment arms

Part 3: Muscle function

Part 4: What does the future offer?

Tuesday, 8 September 2015, 14:00–17:30 h

Seminar 2 Interdisciplinary approach to crouch gait management in cerebral palsy

Chair: Thomas Dreher, Tom Novacheck

Intended for: PTs, Physicians, Bioengineers

Movement analysis has become increasingly important in the orthopedic management of patients with neuromuscular gait disorders. It is a valuable tool for functional assessment, it provides significant information for treatment decisions, and it serves as an objective means for outcome evaluation.

However, the interpretation of gait analysis data in the clinical setting is not always obvious and a multidisciplinary approach (physicians, PTs, bioengineers,...) is important for efficiently interpreting these rather manifold and detailed information for developing treatment recommendations and for optimizing clinical decision making as well as the therapeutic benefit of the chosen intervention. This approach has been established as a common means for gait data interpretation in many centers worldwide. However each discipline needs to understand the whole process in order to improve the outcome.

The purpose of this seminar is to develop such an interdisciplinary approach for treatment recommendations through the presentation and discussion of typical clinical cases. It aims to improve the understanding of the importance of the clinical movement analysis in the decision-making process. Furthermore the seminar includes a saw bone workshop offering to the interdisciplinary team to carry out one step of the surgical treatment.

Timetable

Part 1: An interdisciplinary workshop on development of treatment recommendations of crouch gait in cerebral palsy

Part 2: Distal femoral extension osteotomy – An interdisciplinary saw-bone workshop

Part 3: Discussion of outcomes

Wednesday, 9 September 2015, 09:00–13:00 h

Seminar 3 Biomechanics in prosthetics and orthotics – life demonstration and discussion of biomechanical effects in prosthetics and orthotics

Chair: Daniel Heitzmann

Time duration: 3–5 hours including breaks

The symposia/workshop will be held in one of the gait-labs of the Heidelberg University Clinics.

One person with a lower limb amputation and one person with a lower limb orthosis will be present for life demonstration.

General course of the workshop:

- A brief introduction into prosthetics and orthotics (with an emphasis on the devices of the two users)

Prosthetics:

- Different prosthetic alignments will be tested with a lower limb amputee. Observational gait analysis of the user will be performed by the participants for each alignment modification. Effects of alignment modifications will be checked and visualised static via the LASAR posture alignment device. Dynamic alignment will be checked and visualised via video vector analysis. Results of a full conventional clinical gait analysis with the user in different alignment modifications will be available for discussion.

Orthotics:

- Effects of a lower limb orthosis and different tuning options of the device will be examined. The approach will be similar to the alignment variations in prosthetics. Static and dynamic effects are determined. Again, results of a full conventional clinical gait analysis with the user in different alignment modifications will be available for discussion.
- The workshop will be finished by a brief wrap-up session as summary.

Wednesday, 9 September 2015, 14:00–17:30 h

Seminar 4 Visualisation of motion capture data for better diagnosis and training

Chair: Bertram Müller, Jaap Harlaar

Intended for: Clinicians (PTs, physicians, orthotists and prosthetists) & scientists (biomechanical engineers, human movement scientist, psychologists)

Understanding motion capture data into relevant information is a challenge we face on a daily basis. This includes differencing valid from invalid graph's and the reasoning and also the significance of the data for the intended purpose, which could be clinical or performance related. And once understood, there is still the task on passing such information to third parties.. In order to optimise this process we would need to know the specific expectations of the third person for the best fitting of the information.

This symposium will involve both visualisation to enhance understanding of complex data as well as presenting key biomechanical parameters in a meaningful manner to patients.

Introduction: Visualization in biomechanics – challenges, problems... and solutions?

Bertram Müller

Part 1: Visualisation to enhance diagnostics

MobileBody: Immersive evaluation tools for a practical gait analysis

Workshop (bring your laptop!)

Francisco Geu, Universität Duisburg-Essen, Duisburg

Smart gaming to improve motor dysfunction in children with neurological diseases'

Marjolein van der Krogt, VU University Medical Center, Amsterdam

Part 2: Visualisation of a therapeutic intervention

Real time feedback to minimise kneeload in knee osteo arthritis

Josien van den Noort, VU University Medical Center, Amsterdam

Visualisation of biomechanical data to stroke patients to accelerate their rehabilitation process

Andrew Murphy, University of Strathclyde, Glasgow

Wednesday, 9 September 2015, 14:00–17:30 h

Seminar 5 **Measuring upper extremity movement in clinics and sport:
Theory and practice**

Chair: Stefan van Drongelen, Andrea Cutti

Aim: To introduce, describe and practice with quantitative motion capture techniques for upper extremity movements.

Intended for: Clinicians (occupational therapists, physical therapists, sport therapists), engineers, biomechanists, and kinesiologists measure the movements of the upper extremities in children and adults either to treat or to assess.

Prior experience analyzing and interpreting motion analysis data is beneficial, but not required.

Topic: (Preliminary, further detail to appear in the final program)

Clinical and biomechanical movement analysis of the upper extremity is complex due to the multiple degrees of freedom and wide range of tasks afforded to the upper limb. The aim of this tutorial is to present:

1. A framework to assess and measure quantitative joint motion of the upper extremity
2. Camera-based systems: standardized coordinate systems and marker-set, including different options for scapula tracking
3. Inertial and magnetic sensors: crucial review and upper-extremity protocols
4. Available software for data processing
5. Clinical reporting, scoring and interpretation (clinical cases)
6. Integration of kinematics and surface EMG data

The symposium will be complemented by a set of live demos of available hardware and software, including inertial and magnetic ambulatory systems.

Registration

Pre-Congress

Gait Course/All Seminars Members	560,00 EUR
Gait Course/All Seminars Non-Members	620,00 EUR
Gait Course/All Seminars Students	460,00 EUR
Single Seminar Ticket (Members & Non-Members)	170,00 EUR

Online-Registration

www.esmac2015.com/registration

Meeting Language

English

Credits

The Gait Course was certified by the Doctor's chamber of Baden-Württemberg with 27 Credits (Cat. A)

Seminars

All seminars were certified by the Doctor's chamber of Baden-Württemberg with 4 Credits per Seminar (Cat. A)

Industrial Exhibition

We thank the exhibitors of the ESMAC Pre-Congress for their extraordinary support!

Gottinger Handelshaus OHG	85604 Zorneding, Germany
Simi GmbH	85716 Unterschleißheim, Germany

Venue

Address

Heidelberg University Hospital
Department of Orthopaedics
Schlierbacher Landstrasse 200a
69118 Heidelberg, Germany



Accommodation

To your convenience we have contacted hotels within Heidelberg that are suitable to our congress visitors. Please use the following link to receive the special offers for the selected hotels:

www.esmac2015.com/accommodation/

There is also the possibility of low budget accommodations such as youth hostels.

For booking a youth hostel please follow the link:

www.jugendherberge-heidelberg.de

Travel Information

Journey description from Heidelberg central station (Hauptbahnhof) to Heidelberg University Hospital Department of Orthopaedics:

By Tram

From Heidelberg central station (Hauptbahnhof) please take the tram S1 in the direction of Osterburken, Bahnhof. Leave the tram at Schlierbach, Orthopädie. The journey takes about 10 minutes.

By Bus

From Heidelberg central station (Hauptbahnhof) please take the bus RNV 32 in the direction of Heidelberg, Universitätsplatz. Leave the bus at Heidelberg, Bismarckplatz. Take the bus RNV 35 in the direction of Neckargemünd, Bildungszentrum. Leave the bus at Schlierbach, Orthopädie. The journey takes about 25 minutes.

Thursday, 10 September 2015				
	Neue Aula	Hörsaal 14	Foyer 1st floor	
09:00	BL Baumann Lecture			
09:30	OSo1 Best-Paper-Session – Outcomes			
10:00				
10:30	Coffee Break			
11:00	OSo2 Rehab Adults	OSo3 Muscle Function and Imaging		
11:30				
12:00				
12:30	Lunch Break			
13:00				
13:30	KL1 Keynote Lecture 1			
14:00	OSo4 Foot and Ankle			
14:30				
15:00	Coffee Break			
15:30			PSo5 Foot and Ankle	
16:00				
16:30	OSo8 Upper Extremity	OSo9 Osteoarthritis	PSo6 Trunk and Upper Extremity	
17:00				
17:30				
18:00		ESMAC AGM Meeting		
18:30				
19:00		UG User Group Meeting		
19:30				
20:00				
20:30				
21:00				

Friday, 11 September 2015					
	Neue Aula	Hörsaal 14	Foyer 1st floor		
09:00	KL2 Keynote Lecture 2				
09:30	OS10 Best-Paper-Session – Pathologies and Methods				
10:00					
10:30	Coffee Break				
11:00	OS11 Trunk – Gait and Balance	OS12 Multilevel Problems in Cerebral Palsy			
11:30					
12:00					
12:30	Lunch Break				
13:00					
13:30	OS13 Paediatric Gait				
14:00					
14:30					
15:00	Coffee Break				
15:30			PS14 Outcome study	PS15 Methods and Models	PS16 Orthotics
16:00					
16:30	OS17 Feedback based Rehabilitation	OS18 Orthotics			
17:00					
17:30					
18:00					
18:30					
19:00					
19:30					
20:00					
20:30					
21:00					

Saturday, 12 September 2015					
	Neue Aula	Hörsaal 14	Foyer 1st floor		
09:00	KL3 Keynote Lecture 3				
09:30	OS19 Tone, Weakness and Coordination	OS20 Prosthetics			
10:00					
10:30	Coffee Break				
11:00	OS21 Methods and Models				
11:30					
12:00					
12:30	AC Award Ceremony				
13:00					
13:30					



Leonhard Döderlein (Baumann Lecture)

Leonhard Döderlein started his training in paediatric orthopaedic surgery as early as 1983 when he joined the Orthopaedic Hospital in Rummelsberg under Prof. Thom, who was specialized in the orthopaedic management of patients with poliomyelitis and cerebral palsy. Here he gained his decisive orthopaedic inputs that last until today. From 1986 until 1989 he worked in the Orthopaedic University Hospital in Freiburg where he established a special clinic for handicapped patients with special needs.

From 1989 to 2007 he worked as a consultant surgeon in the Orthopaedic University Hospital in Heidelberg in the Department of Paediatric Orthopaedics where he was head of the Cerebral Palsy Section and Prosthetics and Orthotics. In Heidelberg he had been successful to introduce a 3D instrumented gait laboratory since 1995. This gait laboratory has been busy until today and works as a close cooperation of clinical and biomedical disciplines. The 1999 ESMAC meeting in Heidelberg had been organized together with the gait analysis team and was a quite successful event.

From 2007 onwards he has been chief surgeon of the Paediatric Orthopaedic Hospital in Aschau, Germany, where he could continue his interest in combining movement analysis and clinical work. The gait lab in Aschau is a very active one. Its main research areas are pathologic muscle physiology, torsional problems and foot deformities and their effects on gait. Leonhard Döderlein's main focus is still the integrated approach to gait disorders of neurologic and non-neurologic origins and he uses 3D gait analysis as an integral part of the treatment decision, may it be surgical or conservative, and control. His further interests are foot deformities and upper limb reconstruction. In his leisure time he enjoys family activities and he is a busy postal historian, a discipline which started as a simple stamp collector but then turned out to be another time consuming hobby.



Scott Delp

Scott Delp is the James H. Clark Professor, Founding Chairman of the Department of Bioengineering at Stanford, and Director of the National Center for Simulation in Rehabilitation Research. Delp transformed the field of biomechanics by creating highly accurate computer models of musculoskeletal structures and providing them to researchers worldwide using a software system (OpenSim) that he and his team developed. Delp invented fundamental technology for surgical navigation that is now in wide clinical use. Together with Mark Schnitzer and their students, Delp developed novel microendoscopes that allow realtime in vivo imaging of human muscle microstructure. Together with Karl Deisseroth and their students, Delp pioneered the use of optogenetics to control activity in the peripheral nervous system leading to important inventions for treating paralysis, spasticity and pain.

Source: <https://med.stanford.edu/profiles/scott-delp>



Katja Mombaur

Katja Mombaur is Professor at the Interdisciplinary Center for Scientific Computing (IWR) at the University of Heidelberg in Germany, where she heads the Optimization in Robotics & Biomechanics group and the Robotics Lab. She holds a diploma degree in Aerospace Engineering from the University of Stuttgart (1995) and a Ph.D. degree in Mathematics from the University of Heidelberg (2001). In 2002, she was a Postdoctoral Researcher in the Robotics Lab at Seoul National University, South Korea. From 2008 – 2010 she worked as a Visiting Researcher at LAAS-CNRS in Toulouse, France.

She is coordinating the EU Project KoroBot, partner in the EU project MOBOT, as well as PI and Executive Committee Member of the Graduate School HGS MathComp at IWR. Her research interests include the modeling, optimal and inverse optimal control of walking motions of humans and robots with a particular focus on walking stability. She is also interested in applying optimization in the design and control of orthoses and prostheses and in functional electrical stimulation.



Thomas Schack

Thomas Schack is a professor for Neurocognition and Action – Biomechanics at Bielefeld University (Germany). Dr. Schack's main research interest concerns the cognitive architecture of movement, mental movement representation, mental training and the neurophysiological basis of complex movement. Additionally he is interested in research topics like mental control, attention and cognitive robotics. An important component in Thomas Schack's research laboratories (Cognition and Action-Labs: COALA) is the combination of experimental and modelling methods from Psychology, Biomechanics, Cognitive Science and Robotics to learn about the cognitive construction and principles of human actions. The research results are checked in high performance sports. Thomas Schack received excellence certificates in the fields of sport psychology and movement science, e.g. the TOYOTA-Scientific Award in 2002. He is recently Vice-President of the International Society of Sportpsychology (ISSP) and Principal Investigator (PI) and Co-coordinator of the Center of Excellence "Cognitive Interaction Technology" at Bielefeld University. Furthermore he is PI in Large Scale Projects like "Intelligent Coaching Space" and "Kognihome" where motor control research meets computer science and cognitive informatics to support motor activity of humans in future sport and lodging settings.

09:00–09:40 BL Baumann Lecture **Neue Aula**

The many faces of drop foot
Döderlein L. (Aschau, Germany)
 Abstract available on page 36

09:40–10:30 OS1 Oral Session: Best-Paper-Session – Outcomes **Neue Aula**

Chairs: Roberts A. (Oswestry, United Kingdom)
Desloovere K. (Pellenberg, Belgium)

- OS01-01 8'+2' **A kinematic analysis of one-leg vertical jump on average 23 years after injury of the anterior cruciate ligament**
Markström J. (Umeå, Sweden)
- OS01-02 8'+2' **Ponseti method has superior functional outcome to surgery in clubfoot – prospective randomized long-term trial**
Svehlik M. (Graz, Austria)
- OS01-03 8'+2' **Long-term effects of patellar tendon advancement on patella height and proximal tibial growth**
Stout Jean (St. Paul, USA)
- OS01-04 8'+2' **Predicting surgery effect on knee kinematics in cerebral palsy**
Galarraga C. O. (St. Fargeau-Ponthierry, France)
- OS01-05 8'+2' **Effect of continuous intrathecal Baclofen therapy on ambulatory children with cerebral palsy**
Sees Julieanne (Wilmington, United Kingdom)

10:30–11:00 Coffee Break

11:00–12:30 OS2 Oral Session: Rehab Adults **Neue Aula**

Chairs: Harlaar J. (Amsterdam, Netherlands)
Barton, G. (Liverpool, United Kingdom)

- OS02-01 8'+2' **Cognitive function and walking speed in older adults performing four walking tasks**
Duffy Kim (Colchester, United Kingdom)
- OS02-02 8'+2' **Quantifying changes in gait over the adult life span using the iPod**
Lamoth Claudine (Groningen, Netherlands)
- OS02-03 8'+2' **Evaluation of adaptive gait capabilities should be included in falls risk assessment**
Egan Sonja (Dublin, Ireland)
- OS02-04 8'+2' **The energy cost of walking in stroke survivors: (How) does holding a handrail work?**
Houdijk H. (Amsterdam, Netherlands)

- OS02-05 8'+2' **Characterization of elderly, stroke and chorea populations using gait variability and stability indexes**
Bisi Maria Christina (Bologna, Italy)
- OS02-06 8'+2' **Contribution of personalized AVATAR for post stroke gait rehabilitation: A preliminary study**
Agopyan H. (Nice, France)
- OS02-07 8'+2' **Modular organization in lower limbs of persons with multiple sclerosis after rehabilitation**
Jonsdottir Johanna (Milan, Italy)

11:00–12:30 OS3 Oral Session: Muscle Function and Imaging **Hörsaal 14**

Chairs: Graham K. (Parkville, Australia)
Harlaar J. (Amsterdam, Netherlands)

- OS03-01 8'+2' **Wavelet spectra of surface EMG during gait in children with di- and tetraplegic spastic cerebral palsy**
Bracht-Schweizer Katrin (Basel, Switzerland)
- OS03-02 8'+2' **Length of the gastrosoleus complex and dynamic EMG of peroneus longus and gastrocnemius medialis in hemiplegic children with equinovarus: The hypothesis of the spastic cocontraction**
Boulay C. (Fuveau, France)
- OS03-03 8'+2' **Reliability and validity of 3D freehand ultrasound**
Cenni F. (Leuven, Belgium)
- OS03-05 8'+2' **Validity of efficient ultrasound methodologies to measure muscle and tendon lengths**
Cenni F. (Leuven, Belgium)
- OS03-04 8'+2' **Echogenicity intensity of the medial gastrocnemius and tendon achilles in age matched CP and TD children**
Schless S. (Pellenberg, Belgium)
- OS03-06 8'+2' **A 3D ultrasound platform to assess medial gastrocnemius lengthening during slow passive stretch in typically developing children and children with cerebral palsy**
Bar-On Lynn (Pellenberg, Belgium)
- OS03-07 8'+2' **Differences in co-contraction level between CP and TD children during a functional and isometric strength assessment**
Goudriaan Marije (Pellenberg, Belgium)
- OS03-08 8'+2' **Effect of muscles' activation on proximal femoral growth tendency**
Yadav Priti (Stockholm, Sweden)

12:30–13:30 Lunch Break

Thursday, 10 September 2015
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13:30–14:00 KL Keynote Lecture 1 **Neue Aula**

Optimizing human performance
Delp S. (Stanford, USA)
 Abstract available on page 36

14:00–15:00 OS4 Oral Session: Foot and Ankle **Neue Aula**

Chairs: Böhm H. (Aschau, Germany), Baker R. (Salford, United Kingdom)

- OS04-01 8'+2' **The correlation between rear foot angle and the force applied to the knee extensor mechanism in subjects with subtalar hyper pronation**
Razeghi M. (Shiraz, Iran)
- OS04-02 8'+2' **Early outcomes of surgery for equinovarus deformity in CP using a multi-segment foot model**
Tatay Diaz Angela (Sevilla, Spain)
- OS04-03 8'+2' **The effect of plantar flexor lengthening on foot pressure in children with cerebral palsy**
Miller F. (Wilmington, United Kingdom)

15:00–15:30 Coffee Break

15:30–16:30 PS05 Poster Session: Foot and Ankle **Foyer 1st Floor**

Chair: Stebbins Julie (Oxford, United Kingdom)

- PS05-01 **Preferred foot strategy for sprint initiation in children**
Tottori N. (Kusatsu, Shiga)
- PS05-02 **Does clinically measured ankle plantar flexor muscle strength or weakness correlate with gait velocity, ankle kinematics and kinetics during walking for healthy individuals?**
Akalan N. (Istanbul, Turkey)
- PS05-03 **Prediction of first rocker using pedobarography**
Wojciechowski Elizabeth (Westmead, Australia)
- PS05-04 **The impact of obesity on plantar pressure and balance ability in children**
Patikas D. (Serres, Greece)
- PS05-05 **Review of muscle torque values during rehabilitation process of patients who underwent complete anatomical three-bundle reconstruction of achilles tendon**
Syrek Magdalena (Warszawa, Poland)
- PS05-06 **Midfoot joints compensate the decreased dorsal extension of ankle joint following clubfoot correction**
Dussa C. (Aschau, Germany)

PS05-07 **Is flexibility of paediatric flatfeet during heel-raise gender-specific?**
Krautwurst Britta K. (Heidelberg, Germany)

PS05-08 **Evaluation of clubfoot treatment with a dynamic orthosis**
Manousaki Evgenia (Lund, Sweden)

PS05-09 **Comparison of multi-segmental kinematic between normal and flat foot during squat phase of anterior and lateral step down test**
Lucareli P. (Sao Paulo, Brazil)

PS05-10 **Repeatability of a 3D multi-segment foot model during anterior and lateral step down tests**
Lucareli P. (Sao Paulo, Brazil)

15:30–16:30 PS06 Poster Session: Trunk and Upper Extremity **Foyer 1st Floor**

Chair: Armand S. (Geneva, Switzerland)

- PS06-01 **Balance recovery reaction in individuals with nonspecific low back pain: Interactive effects of attention and postural challenge**
Etemadi Yasaman (Tehran, Iran)
- PS06-02 **Normal subjects with different sagittal spino-pelvic morphotypes may walk differently**
Bakouny Z. (Beirut, Lebanon)
- PS06-03 **Lumbopelvic rhythm in healthy subjects performing squat-lifting and finger-floor-distance tasks**
Widhalm K. (Vienna, Austria)
- PS06-04 **Upper limb kinematic calculations of a biomechanical model for motion analysis**
Dawson D. (Cork, Ireland)
- PS06-05 **Humeral retroversion: The complexity of assigning reference axes in 3d and its influence on measurement**
van de Bunt F. (Amsterdam, Netherlands)
- PS06-06 **Three dimensional analysis of shoulder movement patterns in shoulders with anterior instability: A comparison of kinematics with normal shoulders and the influence of stabilisation surgery**
Wright A. (Manchester, United Kingdom)
- PS06-07 **Three dimensional kinematic analyses of movement control of individual fingers post-stroke**
Johansson Anna-Maria (Umeå, Sweden)
- PS06-08 **The influence of specific upper limb rehabilitation in a post-stroke patients on the rehacing and on the upper limbs movements during gait**
Pianta Lucia (Oggebbio, Italy)
- PS06-09 **Objective measurement of fine motor skills in common diseases of the hand**
Pippich Katharina (Munich, Germany)

15:30–16:30 PS07 Poster Session: Pathology and Gait Interpretation Foyer 1st Floor

Chair: *Viehweger Elke (Marseille, France)*

- PS07-01 **Gait pattern comparison in moderate and severe CMT patients**
Hwang Sun Hee (Seoul, South Korea, ROK)
- PS07-02 **The relation between kinematic parameters and gait efficiency in children with crouch gait pattern**
Pouliot-Laforte Annie (Montreal)
- PS07-03 **Surface EMG in juvenile patients with cerebral palsy: What makes clinical interpretation difficult?**
Romkes Jacqueline (Basel, Switzerland)
- PS07-04 **Internal rotation gait as a compensatory mechanism to restore hip abduction moment arm in children with cerebral palsy**
Niklasch Mirjam (Heidelberg, Germany)
- PS07-05 **Clinical decision making in spastic bilateral CP – planning interventions using clinical gait analysis: A case study**
Alvela Mari (Haapsalu, Estonia)
- PS07-06 **Size and length of the medial gastrocnemius and tendon in typically developing and cerebral palsy children**
Cenni F. (Leuven, Belgium)
- PS07-07 **Neural correlates for freezing of gait after hypoxic-ischemic brain injury. A preliminary study**
Kim Na Young (Seoul, South Korea, ROK)
- PS07-08 **Methodological reliability of echogenicity intensity in muscle ultrasonography**
Schless S. (Pellenberg, Belgium)
- PS07-09 **Knee malalignment influences the electromyographic activity of selected lower limb muscles during gait in boy adolescents**
Anbarian M. (Hamedan, Iran)
- PS07-10 **Dynamic stability in patients with joint hypermobility syndrome during steady state treadmill walking**
Richards Rosie (Amsterdam, Netherlands)
- PS07-11 **Differences in spatio temporal parameters between paraplegic and tetraplegic patients during primary rehabilitation in the first year post injury**
Hartmann Kathrin (Nottwil, Switzerland)
- PS07-12 **Repeatability and treatment sensitivity of the repetitive movement test in children with spastic cerebral palsy**
Piening M. (Amsterdam, Netherlands)
- PS07-13 **Gait synthesis assessment of the effect of crouch gait and hip internal rotation on “stiff-knee” gait**
Pimenta dos Santos Alexandra (St. Fargeau-Ponthierry, France)

- PS07-14 **EEG control of gait in children with cerebral palsy. Preliminary data for the construction of a brain computer interface**
Merma Lara S. (Madrid, Spain)
- PS07-16 **Normalization of EMG amplitude using manual muscle testing: Perspective in clinical gait analysis**
Tabard Anne (Geneva, Switzerland)
- PS07-17 **Gait analysis, metabolic energy expenditure and functional evaluation in children with Duchenne muscular dystrophy**
Vasco Gessica (Rome, Italy)
- PS07-18 **Gait deviation index for the assessment of normal pressure hydrocephalus**
Lucareli P. (Sao Paulo, Brazil)

16:30–17:45 OS08 Oral Session: Upper Extremity Neue Aula

Chairs: *Fradet Laetitia (Chasseneuil du Poitou, France)*
van Drongelen S. (Frankfurt, Germany)

- OS08-01 8'+2' **Three dimensional movement analysis of the upper limb during activities of daily living in children with obstetric brachial plexus palsy: Comparison with healthy controls**
Mahon Judy (Dublin, Ireland)
- OS08-02 8'+2' **Long-term functional outcome of children with total obstetric brachial plexus palsy after surgery**
Zietz Doerte (Bochum, Germany)
- OS08-03 8'+2' **Quantification of dystonia in a group of children with bilateral CP using 3D upper limb motion analysis parameters**
Pons Roser (Athens, Greece)
- OS08-04 8'+2' **Impact of elbow angular velocity on muscle activation and coactivation during active elbow extension and supination in children with spastic hemiplegic cerebral palsy**
Sarcher Aurelie (Nantes, France)
- OS08-05 8'+2' **The objective measurement of diadochokinesis in children with bilateral spastic cerebral palsy**
Mattner Sarah (Heidelberg, Germany)
- OS08-06 8'+2' **Does kinematics add meaningful information to clinical assessment in upper limb rehabilitation after stroke?**
Pianta Lucia (Oggebbio, Italy)
- OS08-07 8'+2' **Augmented kinematic feedback is more effective to promote scapulothoracic control and performance than clinician-provided feedback**
Antunes Ana (Lisboa, Portugal)

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16:30–17:45 OS09 Oral Session: Osteoarthritis Hörsaal 14

*Chairs: Westhoff Bettina (Düsseldorf, Germany)
Thompson Nicky (Oxford, United Kingdom)*

- OS09-01 8'+2' **Unilateral hip osteoarthritis: Its effects on preoperative lower limb muscle activation**
Stief F. (Frankfurt, Germany)
- OS09-02 8'+2' **Exploring associations between gait quality and other knee-related outcome measures in individuals with severe knee osteoarthritis**
Eriksson Naili Josefine (Stockholm, Sweden)
- OS09-03 8'+2' **Dynamic gait analysis of unloading brace effect in patients with gonarthrosis**
Kubisova Michaela (Olomouc, Czech Republic)
- OS09-04 8'+2' **Objectively measured gait function of both limbs before and after unilateral knee arthroplasty**
Metcalfe A. (Cardiff, United Kingdom)
- OS09-05 8'+2' **The relationship between joint alignment and biomechanics in total knee arthroplasty: An in-vivo analysis**
Metcalfe A. (Cardiff, United Kingdom)
- OS09-06 8'+2' **Muscle activations before and after total knee arthroplasty: An analysis of 11 different motor tasks**
Scheys L. (Pellenberg, Belgium)
- OS09-07 8'+2' **Quantification of gait deviations in alkaptonuria: A comparison of joint angles versus marker coordinates**
Barton G. (Liverpool, United Kingdom)

18:00–19:00 ESMAC AGM Meeting Hörsaal 14

19:00–21:00 VICON User Group Meeting Hörsaal 6

09:00–09:30 KL Keynote Lecture 2 Neue Aula

Model-based optimization for human movement analysis
Mombaur Katja (Heidelberg, Germany)
Abstract available on page 37

09:30–10:30 OS10 Best-Paper-Session: Pathologies and Methods Neue Aula

*Chairs: Miller F. (Wilmington, United Kingdom)
Gutierrez Farewik L. (Stockholm, Sweden)*

- OS10-01 8'+2' **Altered transverse plane leg alignment and forefoot supination predispose paediatric flatfeet for knee overloading**
Hösl M. (Aschau, Germany)
- OS10-02 8'+2' **A novel method to evoke stretch reflexes during gait using treadmill accelerations**
Sloot Lizeth (Amsterdam, Netherlands)
- OS10-03 8'+2' **Inter- and intrarater reliability of an international consensus-based gait classification system in children with cerebral palsy**
Nieuwenhuys Angela (Pellenberg, Belgium)
- OS10-04 8'+2' **Validation of hip joint center localization methods during gait analysis using 3D EOS imaging in typically developing and cerebral palsy children**
Assi A. (Beirut, Lebanon)
- OS10-05 8'+2' **Standing & walking posture in children with bilateral spastic cerebral palsy: Are they related?**
Fry Nicola (Borehamwood, United Kingdom)
- OS10-06 8'+2' **Knee moment-knee angle characteristics and muscle morphology in children with spastic cerebral palsy selected for medial hamstring lengthening**
Haberfehlner Helga (Amsterdam, Netherlands)

10:30–11:00 Coffee Break

11:00–12:30 OS11 Oral Session: Trunk – Gait and Balance Neue Aula

*Chairs: Romkes Jacqueline (Basel, Switzerland)
Stief F. (Frankfurt, Germany)*

- OS11-01 8'+2' **Postural strategy and trunk muscle activation during prolonged standing in chronic low back pain patients**
Ringheim Inge (Stavern, Norway)
- OS11-02 8'+2' **Do children with congenital blindness have balance deficits? Evidence from a posturography study with traditional and new parameters**
Petrarca M. (Rome, Italy)

OS11-03	8'+2'	The influence of sacroiliac dysfunction on the plantar load distribution patterns in gait – a paedobarographic study <i>Rieken J. (Rosenheim, Germany)</i>
OS11-04	8'+2'	Trunk kinematics and lower lumbar spinal loading during paediatric cerebral palsy gait <i>Kiernan D. (Dublin, Ireland)</i>
OS11-05	8'+2'	Head and trunk movements during turn while walking in children with cerebral palsy <i>Bartonek Asa (Stockholm, Sweden)</i>
OS11-07	8'+2'	Excessive lateral trunk lean during walking in cerebral palsy: Does it return to normal during running? <i>Böhm H. (Aschau, Germany)</i>
OS11-08	8'+2'	The reliability of the segmental assessment of trunk control (SATCo) in children with cerebral palsy <i>Hansen Lisbeth (Hvidovre, Denmark)</i>
OS11-06	8'+2'	Relationship between spino-pelvic parameters and gait kinematics in children with cerebral palsy <i>Massaad Abir (Beirut, Lebanon)</i>
11:00–12:30 OS12 Oral Session: Multilevel Problems in Cerebral Palsy Hörsaal 14		
<i>Chairs: Novacheck T. (St. Paul, USA) Gough M. (London, United Kingdom)</i>		
OS12-01	8'+2'	Causes of the internal hip rotation gait profile in children with cerebral palsy <i>Massaad Abir (Beirut, Lebanon)</i>
OS12-02	8'+2'	Long-term changes in dynamic hip rotation following femoral derotational osteotomy <i>Schwartz Marta (St. Paul, USA)</i>
OS12-03	8'+2'	Long-term outcome of tibial derotation osteotomies in children with cerebral palsy <i>Serhan M. (Wilmington, United Kingdom)</i>
OS12-04	8'+2'	Selective dorsal rhizotomy with or without correction of bony deformities in children with cerebral palsy: The effect on gait <i>Huenaerts Catherine (Pellenberg, Belgium)</i>
OS12-05	8'+2'	Patella lowering is effective in the treatment of crouch gait in cerebral palsy: A clinical and biomechanical retrospective comparative study <i>Desailly E. (St. Fargeau-Ponthierry, France)</i>
OS12-06	8'+2'	Changes in modular control of gait following SEMLS in children with cerebral palsy <i>Loma-Ossorio García Marta (Madrid, Spain)</i>

OS12-07	8'+2'	Gait abnormalities in neglected adult cerebral palsy patients <i>Aydil S. (Istanbul, Turkey)</i>
OS12-08	8'+2'	Multilevel surgery in adults with cerebral palsy <i>Putz Cornelia (Heidelberg, Germany)</i>
12:30–13:30 Lunch Break		
13:30–15:00 OS13 Oral Session: Paediatric Gait Neue Aula		
<i>Chairs: Svehlik M. (Graz, Austria) Stout Jean (St. Paul, USA)</i>		
OS13-01	8'+2'	Weekly changes of gait temporal parameters during the first two months of independent walking: a longitudinal study <i>Bisi Maria Cristina (Bologna, Italy)</i>
OS13-02	8'+2'	Characterising variability of gait in ambulant children under five <i>Stebbins Julie (Oxford, United Kingdom)</i>
OS13-03	8'+2'	Age-dependent flexibility in paediatric flatfeet monitored during heel-raise <i>Krautwurst Britta K. (Heidelberg, Germany)</i>
OS13-04	8'+2'	Complexity of muscle activity does not change in typically developing children walking on a treadmill at multiple slopes and speeds <i>Rozumalski A. (St. Paul, USA)</i>
OS13-05	8'+2'	Associations of the mechanical, anthropometric and gait contributors to the knee adduction moment during paediatric gait <i>Mahaffey R. (London, United Kingdom)</i>
OS13-06	8'+2'	Gait patterns of children with Charcot-Marie-Tooth disease <i>Wojciechowski Elisabeth (Westmead, Australia)</i>
OS13-07	8'+2'	The impact of laterality on gait in children with clubfoot <i>Löf Elin (Stockholm, Sweden)</i>
OS13-08	8'+2'	Gait deviations in transverse plane after SCFE in dependence of the femoral offset <i>Westhoff Bettina (Düsseldorf, Germany)</i>
OS13-09	8'+2'	Alterations in gait and muscle function in adolescent boys with haemophilia <i>Suckling L. (London, United Kingdom)</i>

15:00–15:30 Coffee Break

15:30–16:30 PS14 Poster Session: Outcome study Foyer 1st Floor

Chair: Molenaers G. (Pellenberg, Belgium)

- PS14-01 **One-leg rise performance of ACL-injured subjects approximately 20 years after injury compared to controls**
Strong A. (Umeå, Sweden)
- PS14-02 **Investigation of two different psoas releasing procedures on contribution of stiff knee. Gait pattern for children with cerebral palsy: Over the pelvic brim and at the lesser trochanter**
Gulenc B. (Istanbul, Turkey)
- PS14-03 **Outcome in cerebral palsy patients after 4–5 years of rehabilitation and Botulinum toxin treatments**
Syczewska M. (Warszawa, Poland)
- PS14-04 **Improvement of functional mobility and passive range of motion in very young children with cerebral palsy after injection of Botulinum toxin**
Bonikowski M. (Zagórze, Poland)
- PS14-05 **Improvement of swing phase abnormalities in children with cerebral palsy after robot-assisted gait training**
Bonikowski M. (Zagórze, Poland)
- PS14-06 **The effect of a cognitive dual task on step-time-constrained overground-walking variability in young and older individuals**
Hamacher D. (Magdeburg, Germany)
- PS14-07 **3 dimensional gait analysis of healthy subjects in different age groups in Turkey**
Beng K. (Istanbul, Turkey)
- PS14-09 **Effect of weight loss on gait kinematics and ground reaction force of obese adolescents in downhill walking: Pilot study**
Claas Elisabeth (Hallein-Rif, Austria)
- PS14-10 **Physical therapy for infants with postural asymmetry**
Jung M. (Idstein, Germany)
- PS14-11 **Effects of neurodynamic mobilization versus foam rolling treatment after delayed-onset muscle soreness**
Romero-Moraleda Blanca (Madrid, Spain)
- PS14-12 **Quantitative evaluation of gait kinematics in post-stroke patients: The effects of a specific integrated upper limb rehabilitation**
Pianta Lucia (Oggebbio, Italy)
- PS14-13 **Gait rehabilitation of post-stroke patients by treadmill gait training with visual feedback**
Pavare Zane (Jurmala, Latvia)

15:30–16:30 PS15 Poster Session: Methods and Models Foyer 1st Floor

Chair: Postans N. (Oswestry, United Kingdom)

- PS15-01 **The effect of a novel footwear telemetry antenna system on the spatio-temporal characteristics of gait in an elderly population at low risk of falling**
Brannigan C. (Dublin, Ireland)
- PS15-02 **Predictive simulations of perturbed human posture to explore balance control strategies in the young and the elderly**
Afschrift M. (Leuven, Belgium)
- PS15-03 **Accelerometric analysis of gait in young and elderly subjects: Frequency analysis**
Bisi Maria Cristina (Bologna, Italy)
- PS15-04 **Walking speed in older adults under different walking challenges**
Duffy Kim (Colchester, United Kingdom)
- PS15-05 **Responses of knee kinematics to controlled lateral perturbations**
van den Noort Josien (Amsterdam, Netherlands)
- PS15-06 **Assessment of gait performance variability as potential indicator of fall risk: Study design**
Svoboda Z. (Olomouc, Czech Republic)
- PS15-07 **A comparison of non-motorized treadmill gait kinematics to both overground and motorized treadmill locomotion**
Fullenkamp A. (Bowling Green, USA)
- PS15-08 **Kinematics of turning during ambulation**
Jawad A. (Sydney, Australia)
- PS15-09 **The Effect of a novel footwear telemetry antenna system on the spatio-temporal characteristics of gait and running in a healthy adult population**
Brannigan C. (Dublin, Ireland)
- PS15-10 **Comparison of an inertial sensor based motion measurement system with a 3D-reflex marker based motion capture system**
Seidel D. (Stuttgart, Germany)
- PS15-11 **Influence of kinematics, anthropometry and kinetics data errors on inverse dynamics solutions during running**
Kim H. (Seto, Japan)
- PS15-12 **Markerless motion capture: validity of Microsoft kinect cameras and iPi soft**
Arulampalam J. (Sydney, Australia)
- PS15-13 **Repeatability study of the cast model for gait analysis**
Pinzone Ornella (Salford, United Kingdom)
- PS15-14 **Modifications of leg swing related to the probability of being moved**
Castellote J. (Madrid, Spain)
- PS15-15 **Comparison of a bespoke biomechanical model to the industry gold standard for calculation of lower limb kinematics during walking**
Millar Lindsey (Glasgow, United Kingdom)

15:30–16:30 PS16 Poster Session: Orthotics Foyer 1st Floor

Chair: *Beyaert C. (Metz, France)*

- PS16-01 **Effect of ankle foot orthosis on crouch gait in patients with cerebral palsy: What can we expect?**
Böhm H. (Aschau, Germany)
- PS16-02 **Spastic hemiparetic gait pattern after over 6 month period of using carbon-fibre anterior leaf spring AFO? Flaws and advantages**
Alvela Mari (Haapsalu, Estonia)
- PS16-03 **The contribution of a rigid and a spring-hinged Ankle Foot Orthosis to ankle work in children with cerebral palsy**
Kerkum Yvette (Amsterdam, Netherlands)
- PS16-04 **Determining and implementing the individual normal posture in making a negative cast to produce orthoses for patients with neurological gait disorders**
Sabbagh D. (Lüneburg, Germany)
- PS16-05 **Technically controlling joint angles while making a negative cast as basis of functional orthoses for patients with neurological gait disorders**
Sabbagh D. (Lüneburg, Germany)
- PS16-06 **A new leg prosthesis to improve lateral balance in prosthetic walking**
van Hal E. (Groningen, Netherlands)
- PS16-07 **Feasibility and reproducibility of using an exoskeleton able to emulate muscle contractures during walking**
Attias M. (Geneva, Switzerland)

16:35–17:45 OS17 Oral Session: Feedback based Rehabilitation Neue Aula

Chairs: *Kranzl A. (Vienna, Austria)*
Ferrarin M. (Milan, Italy)

- OS17-01 8'+2' **The effect of additional Virtual Reality training on balance control in children with Cerebral Palsy after lower limb surgery: A pilot-study**
Meyns P. (Ghent, Belgium)
- OS17-02 8'+2' **Real-time feedback to improve gait in children with cerebral palsy**
van der Krogt Marjolein (Amsterdam, Netherlands)
- OS17-03 8'+2' **The effect of self-paced speed and virtual reality on treadmill gait in children with cerebral palsy**
Sloot Lizeth (Amsterdam, Netherlands)
- OS17-04 8'+2' **Kinetic comparison of walking on a treadmill versus over ground in children with cerebral palsy**
van der Krogt Marjolein (Amsterdam, Netherlands)

- OS17-05 8'+2' **Positive effects of backward downhill treadmill training on spastic equinus gait**
Hösl M. (Aschau, Germany)
- OS17-06 8'+2' **An anti-gravity treadmill following fractures of the foot or ankle: Does its use enhance gait rehabilitation?**
Niklaus Laura (Chemnitz, Germany)
- OS17-07 8'+2' **A 6-week unsupervised home-based exergaming training program to improve balance of older adults**
Lamoth Claudine (Groningen, Netherlands)

16:35–17:45 OS18 Oral Session: Orthotics Hörsaal 14

Chairs: *Broström E. (Stockholm, Sweden)*
Brunner R. (Basel, Switzerland)

- OS18-01 8'+2' **Influence of body weight support on wearable devices reproducing normal gait**
Gomez Maria (Madrid, Spain)
- OS18-02 8'+2' **Gait dynamics in the wide spectrum of children with arthrogryposis**
Eriksson Marie (Stockholm, Sweden)
- OS18-03 8'+2' **The microprocessor controlled C-brace orthosis and conventional knee-ankle-foot-orthoses: Comparative biomechanical evaluation of functionality**
Schmalz T. (Göttingen, Germany)
- OS18-04 8'+2' **Optimizing knee kinematics in mid-stance by tuning the ankle foot orthoses – footwear combination of children with cerebral palsy: A case series**
van Beeten Barbara (Wijk aan Zee, Netherlands)
- OS18-05 8'+2' **The effects of different degrees of ankle foot orthosis stiffness on gait biomechanics and walking energy cost**
Kerkum Yvette (Amsterdam, Netherlands)
- OS18-06 8'+2' **Comparative effectiveness of ground reaction and solid ankle foot orthoses for crouch gait in children with cerebral palsy**
Schwartz M. (St. Paul, USA)
- OS18-07 8'+2' **Assessment of the rocker sole shoes on postural stability in diabetic patients with distal sensory neuropathy**

09:00–09:30 **KL Keynote Lecture 3** Neue Aula

Architecture of action and principles of motion planning
 Schack T. (Bielefeld, Germany)
 Abstract available on page 37

09:30–10:30 **OS19 Oral Session: Tone, Weakness and Coordination** Neue Aula

*Chairs: Schwartz M. (St. Paul, USA)
 van der Krogt Marjolein (Amsterdam, Netherlands)*

- OS19-01 8'+2' **The type of spasticity predicts Botulinum toxin A treatment outcome in children with cerebral palsy**
Bar-On Lynn (Pellenberg, Belgium)
- OS19-02 8'+2' **What's the effectiveness of multilevel intramuscular Botulinum toxin A injection in patients with spastic cerebral palsy patients in a single session?**
Beng K. (Istanbul, Turkey)
- OS19-03 8'+2' **Plantar flexor muscle weakness leads to stiff-knee gait**
Apti A. (Istanbul, Turkey)
- OS19-04 8'+2' **Timing of maximum knee hyperextension in genu recurvatum indicates the underlying pathology in children with bilateral spastic cerebral palsy**
Klotz M. (Heidelberg, Germany)
- OS19-05 8'+2' **Effect of a short walking exercise on crouch gait in children with cerebral palsy**
Ballaz L. (Montreal, Canada)
- OS19-06 8'+2' **Cerebellar transcranial direct current stimulation in a child with ataxic cerebral palsy: A case report**
Grecco Luanda (Boston, USA)

09:30–10:30 **OS20 Oral Session: Prosthetics** Hörsaal 14

*Chairs: Nederhand M. (Enschede, Netherlands)
 Schmalz T. (Göttingen, Germany)*

- OS20-01 8'+2' **Biomechanical investigation of currently available microprocessor controlled prosthetic feet**
Altenburg B. (Duderstadt, Germany)
- OS20-02 8'+2' **Evaluation of a novel prosthetic foot while walking on level ground, ascending and descending a ramp**
Heitzmann D. (Heidelberg, Germany)
- OS20-03 8'+2' **Leg stiffness regulation during running with a lower limb running specific prosthesis**
Houdijk H. (Amsterdam, Netherlands),
- OS20-04 8'+2' **Innovative rehabilitation for warfighters with transfemoral and transtibial amputations**
Wyatt Marilyn (San Diego, USA)

- OS20-05 8'+2' **Developing a set of norm data during activities of daily living – comparison of the 3D kinematics of able-bodied and prosthesis users involving different artificial limbs**
Kranzl A. (Vienna, Austria)
- OS20-06 8'+2' **Effect of stump parameters on postural stability during stance modification in transtibial amputees**
Orechovska Karolina (Olomouc, Czech Republic)

10:30–11:00 **Coffee Break**

11:00–12:30 **OS21 Oral Session: Methods and Models** Neue Aula

*Chairs: Frigo C. (Milano, Italy)
 Houdijk H. (Amsterdam, Netherlands)*

- OS21-01 8'+2' **Continuous time series analysis using a Hidden Markov Model enhances informations about joint angle functionality of human gait**
Kreuzpointner F. (München, Germany)
- OS21-02 8'+2' **Comparison of gait kinematics in children using the Calibration Anatomical System Technique based model (CAST), Instituti Ortopedici Rizzoli (IOR) model and Modified Helen Hayes (MHH) model**
Wachowsky M. (Stuttgart, Germany)
- OS21-03 8'+2' **Correlations between 3D subject-specific skeletal parameters and gait kinematics in asymptomatic adults**
Assi A. (Beirut, Lebanon)
- OS21-04 8'+2' **Prediction of postural strategies**
Dijkstra E. (Stockholm, Sweden)
- OS21-05 8'+2' **Is CoM kinematics a descriptive parameter of gait motor development? Verification on children and adults**
Bisi Maria Cristina (Bologna, Italy)
- OS21-06 8'+2' **Gaitmatcher – search for gait kinematics twins**
Rettig O. (Heidelberg, Germany)
- OS21-07 8'+2' **Automatising gait kinematics classification with fast and accurate machine learning algorithms**
Martins R. (Lisboa, Portugal)
- OS21-08 8'+2' **Experimental assessment of the coupling between shank rotation and subtalar joint kinematics during walking**
Rabuffetti M. (Milano, Italy)

12:30–13:30 **Award Ceremony** Neue Aula

Baumann Lecture**The many faces of drop foot**

*Leonhard Doederlein, Dr. med.
Hospital for Paediatric Orthopaedics, Aschau, Germany*

Drop foot is a clinical entity which seems to be solved at first glance. Steppage gait is a well known compensatory response to improve foot clearance problems caused by the dragging foot. So why should it be difficult to treat this problem by an off the shelf drop foot orthosis or by an appropriate muscle transfers.

Should we really bother about this frequent problem any longer? As a clinician being involved in the treatment of different conditions which may cause drop feet I have been aware of unpredictable results in many cases. If one considers that this problem arises from a large variety of neurological and non neurological etiologies and that the symptoms vary in their severity and clinical signs one wonders why there are until today no attempts for classification nor any treatment algorithms. Gait analysis has the potential to disclose the direct consequences of foot drop on the foot, ankle and toe kinematics and also to shed light on the many possible attempts to compensate either single or combined.

This lecture given by a paediatric orthopaedic surgeon with a long interest in clinical gait analysis tries to arrange etiologic, diagnostic and therapeutic aspects of drop foot in a way which may help to better select appropriate management solutions. Gait analysis data may add important informations if one can ask relevant questions.

Dropfoot etiology should be divided into neurologic (central and peripherea) and non neurologic causes. Furthermore it is of primary importance to distinguish between static and progressive underlying disorders causing this deformity. Any attempt to manage dropfoot by tendon transfers is doomed to failure in such cases in the longer term.

For diagnostic purposes it should be ruled out whether the deformity stands alone or whether it is combined with other problems contributing or augmenting its pathologic effects and also affecting its compensations. Diagnostics are never complete without exactly documenting the individually used compensatory strategies. These may occur in isolation or more frequently as combinations of different mechanisms. A hypothesis why the individual patient uses his own compensation should be formulated by the physician.

Keynote Lecture 1 :**Optimizing Human Performance**

*Scott L. Delp, Ph.D., James H. Clark Professor
Stanford University, Schools of Medicine and Engineering*

Driven by recent advances in wearable robotic systems, the development of technologies that augment human performance has become a focus of intensive research. One of the challenges in developing wearable robotic systems is understanding the interaction between wearable robots and human users. To address this challenge we are developing an optimization framework to synthesize a realistic human movement, assess how actuation provided by a wearable robot interacts with actuation provided by human muscles, and to optimize performance of the human-machine system. My laboratory is implementing this optimization framework in OpenSim, a widely used software package for analysis of human movement. I will discuss our most recent developments and present challenges to the community that must be met to advance our field.

Keynote Lecture 2:**Model-based optimization for human movement analysis**

*Katja Mombauer, Professor
Interdisciplinary Center for Scientific Computing (IWR); University of Heidelberg, Germany*

Gaining fundamental understanding of human movement is important not only for clinical applications but also e.g. for biomechanics, robotics, cognitive sciences, or character animation. Experimental recordings by motion capture systems, force plates, or EMG can give some insights, however for a precise dynamic reconstruction, dynamic models as well as advanced simulation and optimization techniques are required. In this talk, I will present some of our work on dynamic and subject specific modeling of human movement, in particular on walking motions. We use model-based optimization for human movement analysis by fitting dynamic models to recorded data, as well for motion generation or prediction by applying different optimality criteria to the human models. We also present the inverse optimal control approach which serves to identify optimality criteria underlying recorded motion. We present different examples of standard walking motions in different situations and movements with prostheses, orthoses and external physical devices. In the latter cases, optimization can also be applied to improve design and control of the technical devices.

Keynote Lecture 3:**Architecture of Action and Principles of Motion Planning**

*Thomas Schack, Professor Dr. phil.
Bielefeld University, Faculty of Psychology and Sport Sciences*

This presentation examines, in a first step, the cognitive architecture of human action, showing how it is organized over several levels and how it is built up. Basic Action Concepts (BACs) are identified as the major building blocks on the level of mental representations. These BACs are cognitive tools for mastering the functional demands of movement tasks. New experimental results concerning functional links between representation structures and motor learning in complex movements (e.g. golf) are presented. In a second step the presentation deals with principles of cognitive motor planning especially in the field of Manual Action. We investigated in a series of studies not only motor primitives but furthermore such integration and planning principles like sequential effects, end-state-comfort-effects and interference-effects in uni-manual and bi-manual coordination. Results of these studies demonstrate functional aspects and limits of motor planning and support the hypothesis that movements are planned and executed by representations of anticipated body postures. In a last step, the presentation deals with functional links between cognitive motor psychology and robotics. I will provide first insights into the implementation of motor control research into technical platforms (e.g. robots). A special area of our research is designed to study how the development of structured representation (action templates) occurs in human skill acquisition and how it can be applied in robotics. Another question is how movement performance could be optimized with the help of Augmented and Virtual Reality platforms.

Get Together

Date: Wednesday, 9 September 2015, from 18:00 h
Location: Neue Universität Heidelberg
Address: Grabengasse 3-5, 69117 Heidelberg



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We will welcome you to the Annual Meeting at a relaxed evening in the new university building which was built in 1930/31. You will have the possibility to meet and greet with colleagues.

Gala Dinner

Date: Friday, 11 September 2015, from 19:15 h
Price per Person: 80.00 EUR
Location: Heidelberg Palace
Address: Schlosshof 1, 69117 Heidelberg

The stunning location this Gala Dinner will take place at, will take your breath away. The red sandstone Heidelberg castle from the 19th century lays gorgeously set against deep green hills and crowns the Neckar valley. This architectural masterpiece of the renaissance was hit by several war actions and unfortunately wasn't spared by forces of nature as well. You are kindly invited to see this unique building and event location the castle is today and will be hosting a very special night for you.

The event will start with a Heidelberg cable car ride and offer you an exciting evening to meet with colleagues and enjoy the seated dinner. You will receive a cable car ticket with your Gala Dinner Ticket. After the festivities the party is on at the famous "Fasskeller", a wine cellar where the night can be celebrated with music and dancing.

Cable Car Station „Kornmarkt“:
 Zwingerstraße 21, 69115 Heidelberg
 After the Dinner there will be Bus Shuttles from the Heidelberg Palace to the Neue Universität (City Center) with departure at 23:30, 00:30 and 01:00 h



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About the society

European Society for Movement Analysis in Adults and Children

The purpose of ESMAC (the European Society of Movement Analysis for Adults and Children) is to stimulate and advance scientific knowledge, professional interaction and the exchange of ideas among Society members relating to movement analysis in adults and children in clinical and research settings.

ESMAC has been active since the first meeting in Oswestry, UK in 1992. Since then numerous scientists have served on the ESMAC Board to support the scientific dialogue of researchers in the field of movement analysis and its clinical application.

For more information, feel free to visit the homepage: www.esmac.org

ESMAC Awards/Scholarships

ESMAC Travel Scholarship

Travel Scholarships are available to ESMAC members who present their research at the annual meeting and have any difficulties obtaining professional or educational funds from their home country. Five awards of upto 500 euros are available annually for travel and/or accommodation expenses. See www.esmac.org for further details.

Best Paper Award

This award is presented annually to the authors of the best scientific paper. The highest scoring abstracts are nominated as candidates for the best paper award in the programme for the meeting and the oral presentations are assessed during the meeting. The award includes expedited publication in *Gait & Posture* and registration for attendance of the principal author at following year's main congress.

Mentorship Award

Two scholarships of £1000 each are now available to facilitate the existing Mentorship Programme. This enables an ESMAC member to visit another Gait Laboratory to gain specific training/experience. See www.esmac.org for further details.



ESMAC Committee

We thank **Prof. Maurizio Petrarca** for the successful organisation of last year's event in Rome and who has now come to the end of his term on the board.



We are also grateful to **Prof. Jaap Harlaar**, Amsterdam, The Netherlands, who has led this society as President for the last 5 years. He now hands over this responsibility to Dr. Sebastian Wolf who is also this year's local host in Heidelberg together with Dr. Thomas Dreher.

Here are the faces presently on the ESMAC Committee:



Lynn Bar-On is a Physiotherapist with a PhD in Biomedical Sciences from the KU Leuven, Belgium. As a new ESMAC Board member, she is in charge of the mentorship program (find out more on the ESMAC website and via mentor-ship@esmac.org).



Eva Weidenheim Broström, Associate Professor and physiotherapist with a PhD in Paediatric Science from the Karolinska Institutet, Stockholm, Sweden. As a new ESMAC board member, she is in charge of the travel scholarship (find out more on the ESMAC website and via scholarships@esmac.org).



Angela Tatay Diaz is a Paediatric Orthopaedic Surgeon at Hospital Universitario Virgen del Rocío in Sevilla, Spain. As a new ESMAC Board member, she is in charge of PR & Communication with the aim of promoting ESMAC externally and establishing a more fluent relationship between members and the Board.



Thomas Dreher is a senior Paediatric Orthopaedic and Trauma Surgeon at the Clinic for Orthopaedic and Trauma Surgery of the Heidelberg University who specialises in the treatment of neurogenic disorders in children and adults. He is implementing the field of gait and movement analysis to clinical practice. As a member of the ESMAC Board he is responsible for Education and Career Development. Thomas is furthermore Associated Editor and upcoming Editor-In-Chief of the Gait & Posture Journal.



Andreas Kranzl is a Sport Scientist with a PhD from the University of Vienna, Austria. He is the head of the gait analysis laboratory at the Orthopaedic Hospital Speising, Vienna, Austria. As an ESMAC Board member, he is responsible for the ESMAC web page.



Julie Stebbins has been part of the ESMAC Board since 2013. She has taught on the Gait Course since 2005, and has been coordinating the Course since 2012. She currently serves on the Board as Secretary.



Martin Svelik is a certified Paediatric Orthopaedic Surgeon working as a consultant at a Medical University of Graz, Austria. His clinical as well as scientific interest is neuro-orthopaedics, especially gait of children with cerebral palsy. As a new ESMAC Board member he will be responsible for PR & Communication.



Nicky Thompson is a Physiotherapist and Clinical Specialist in Gait Analysis at the Oxford Gait Laboratory, with a PhD in Biomedical Sciences from King's College, London, UK. She is ESMAC Treasurer, Convenor of Best Paper Award and previously ESMAC Secretary (1992-96).



Sebastian Wolf is Physicist and has led the Gait Lab at Heidelberg University Clinics in Germany since 2001. He is an ESMAC Board member since 2014 and involved in Gait course teaching. He is ESMAC President elect for the coming period starting with this years' meeting in Heidelberg.

ESMAC Travel Scholarship

Travel Scholarships are available to ESMAC members who present their research at the annual meeting and have any difficulties obtaining professional or educational funds from their home country. Five awards of up to 500 euros are available annually for travel and/or accommodation expenses. See www.esmac.org for further details.

We congratulate the following 5 scientists who received travel scholarships of 500 EUR each for their excellent contribution to this year's meeting:

Cenni Francesco, Biomedical Engineer doing his PhD at KU Leuven

Yvette Kerkum, Movement Scientist doing her PhD at VU University Amsterdam

Elin Lööf, Physiotherapist doing her PhD at Karolinska Institutet, Stockholm

Pieter Meyns, Physiotherapist, is post-doctoral fellow at dep. Rehabilitation Science, KU Leuven

Lizeth Sloot holds a MSc degree in Medical Physics and is doing her PhD at VU University Amsterdam

Best Paper Award

This award is presented annually to the authors of the best scientific paper. The highest scoring abstracts are nominated as candidates for the best paper award in the programme for the meeting and the oral presentations are assessed during the meeting. The award includes expedited publication in *Gait & Posture* and registration for attendance of the principal author at following year's main congress.

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Upcoming ESMAC meetings

25th Annual Meeting of ESMAC
26th September – 1st October 2016 in Seville (Spain)

26th Annual Meeting of ESMAC
4th – 9th September 2017 in Trondheim (Norway)

27th Annual Meeting of ESMAC
3rd – 8th September 2018 in Prague (Czech Republic)

Save the date to be there!

For more information, feel free to visit the homepage: www.esmac.org

We thank the partners and exhibitors of the 24th Annual Meeting of ESMAC for their extraordinary support!

Partners



Deutsche Arthrose-Hilfe e.V.
60040 Frankfurt/Main, Germany



DFG – Deutsche Forschungsgemeinschaft
53175 Bonn, Germany



Prophysics
8302 Kloten, Switzerland



Vicon Motion Systems
OX20JB Oxford, United Kingdom

Exhibitors

International AKU Societies	70176 Stuttgart, Germany
Bertec Inc.	43229 Columbus, USA
CODAMOTION Charnwood Dynamics Ltd.	LE7 7PJ Leicestershire, United Kingdom
Cometa Systems	20010 Bareggio MI, Italy
CONTEMPLAS GmbH	87437 Kempten, Germany
DIERS International GmbH	65388 Schlagenbad, Germany
DIRAME ORTHO SA/NV	1740 Ternat, Belgium
FIOR & GENTZ Gesellschaft für Entwicklung und Vertrieb von orthopädischen Systemen mbH	21337 Lüneburg, Germany
Gait up	1006 Lausanne, Switzerland
Made for Movement GmbH	30657 Hanover, Germany
MICROGATE Srl	39100 Bolzano, Italy
Motekforce Link BV	1101 GE Amsterdam, The Netherlands
myon AG	6103 Schwarzenberg, Switzerland
Noraxon Inc.	Scottsdale, Arizona 85260, USA
novel gmbh	81675 Munich, Germany
ORTHOVATIVE GmbH	83703 Gmund, Germany
Prophysics	8302 Kloten, Switzerland
Qualisys AB	41105 Gothenburg, Sweden
Velamed GmbH	50825 Cologne, Germany
Vicon Motion Systems	OX20JB Oxford, United Kingdom
zebris Medical GmbH	88316 Isny, Germany

Refers to date of printing

Company Profiles

(in alphabetical order)



The **International AKU-Societies** is a loose association of worldwide AKU-Societies supporting AKU-patients and their families. Alkaptonuria (AKU, ochronosis) is a rare genetic disease, caused by an enzymatic deficiency of the tyrosine metabolism. The resulting homogentisic acid (HGA) is accumulated and oxidised to yield the ochronotic pigment, thereby discolouring urine and connective tissues such as cartilage, tendons, ligaments, muscles, heart valve, ear and eye. Ochronotic cartilage is prone to biomechanical stress and degradation, leading to an early-onset of arthropathy. Currently, there is no cure available and treatment entails symptom relief such as pain management, physiotherapy and surgery. A FP7-funded clinical trial is presently conducted for curative treatment. In AKU there is a need for gait analysis, a documented method to quantify how movement function changes. Complementary to other investigations on AKU, it adds to the overall understanding of the disease process. An emphasis on gait and movement will be essential when evaluating the effect of interventions which eventually aim to improve the functioning of AKU patients in the context of activities of daily living.



Bertec Corporation was founded in 1987 in Columbus, Ohio by Dr. Necip Berme. An international industry leader in force measurement technology for biomechanics, Bertec specializes in gait analysis equipment, balance assessment and training, ergonomics, athletic performance, and industrial applications for specialized load cells/transducers.



Codamotion Providing 3D Clinical Gait Analysis Systems to the world's leading Gait Labs with the highest accuracy and most reliable 3D tracking has been a core Codamotion speciality for over 20 years.

Early adopters included the Moss Rehab Center in Philadelphia, Central Remedial Clinic (CRC) in Dublin, Chaim Sheba Medical Centre in Tel Aviv, and both University College London Hospitals and the Royal Orthopaedic Hospital in London. More recent installations have included Fontys Hogescholen in the Netherlands, and UGECAM Coubert and Grenoble Hospital, and several new labs in China and South America.

Codamotion has standard Gait Systems ready-made for labs that give the user everything from special easy-to-apply marker accessories, to the analysis protocols and report templates that ensure consistent, reliable gait analyses every time. We install; you use. Codamotion also provides a complete Lab design and specification service for those with specific measurement needs, contact us to find out more.

We look forward to meeting you at ESMAC in Heidelberg to discuss your research project and our potential solution fit, so be sure to visit our stand when you get chance.



Cometa srl is a company specialized in the development, production, and marketing of wireless EMG devices. Founded in 2001, it patented in 2005 the first wireless surface EMG system without reference electrode. Since then, many improvements have been added to the basic product, including tri-axis accelerometers, memory on board, waterproof probes and more recently inertial sensors. The development of the systems includes the creation, the hardware project, the testing, prototyping, production, certification, sale and support. COMETA is ISO 13485 certified and maintains a quality system under CE 93/42 rule for medical systems. All products are also FCC, FDA and RLJ (Radio Law of Japan) approved. It distributes its products in more than 30 countries worldwide.



CONTEMPLAS GmbH with its headquarter in Kempten/Germany, develops and distributes worldwide software solutions for general motion analysis in the sport and medicine market.

With the motion analysis software TEMPLO and VICON MOTUS, CONTEMPLAS offers the possibility to do professional analysis in different fields of applications and integrate other systems, such as EMG, pressure and force measurement.



The objective of **DIERS** is to offer the market a comprehensive biomechanical product portfolio for a holistic analysis of the human body.

In our product development, value is placed on interdisciplinary use by various profession groups such as orthopaedists, orthopaedic technicians, physical therapists, dentists, orthodontists, sports medicine specialists etc.

Core expertise is not only the measurement of the spine in movement.

DIERS has meanwhile become a worldwide market leader in the field of optical 3D / 4D postural and motion analysis from head to toe.



FIOR & GENTZ develops and distributes products for the orthotic field of orthopaedic technology. The company's main focus is on system joints for the production of orthoses and on therapeutic shoes.

The customers of FIOR & GENTZ are orthopaedic workshops, medical supply stores and orthopaedic shoemakers. The products are only sold via specialised traders who adapt them to the patient; this is required by the high quality standard. The quality standard has been controlled and certified by an independent certification organisation according to the international standards ISO 9001 and ISO 13485.

Since 2011, the company is based on its own, new premises in Lüneburg uniting all departments under one roof. The technology centre with work space and patient lounge is modernly equipped so that workshops for customers can take place there.

The company is not only dedicated to technology, but also to science. With orthotic treatment concepts for patients with apoplexy or cerebral palsy, the company relies on communication with and within the entire interdisciplinary team consisting of physicians, physiotherapists, patients and their relatives.



Gait Analysis – Physical Activity Monitoring – Inertial Sensors

Gait Up offers a simple and accurate tool to measure and analyze human locomotion. This innovative solution is the Physilog® wearable sensor and its dedicated algorithm developed through collaborations between research and clinics.

Gait Up is a must-have for institutions requiring routinely easy and valid spatio-temporal gait performance parameters! Gait Up also provides a Physical Activity monitor with exclusive parameters, and offers its expertise to your custom project.

Born in Research – Made in Switzerland – Used in Clinics



Innowalk Pro is a unique, motorized medical device for clinical practice. Innowalk Pro gives patients a fantastic opportunity to experience assisted, guided, and repetitive movement– in an upright weight-bearing position. Using Innowalk Pro does not require an independent ability to stand or walk.

Innowalk is a unique, motorized medical device. Innowalk gives disabled people a fantastic opportunity to experience assisted, guided, and repetitive movement — in an upright weight-bearing position.

NF-Walker is a fantastic and dynamic medical device that enables disabled people to stand and walk. The user gets a unique opportunity to explore their surroundings while keeping both hands free.



Incorporated in Bolzano in 1989, **Microgate** started out operating primarily in the development of sports timing solutions, creating the world's first radio-based chronometer. Microgate has been closely involved in projects in the astronomy field, developing 'adaptive optics'

technology, which is currently employed in the world's most powerful observatory telescopes for the correction of images of the universe. Microgate today operates through four divisions: Timing, Training & Sport, Medical Rehab, and Engineering. Microgate exports its products to 35 countries across the world and collaborates actively with research centres, universities and sports clubs of international standing. In 2010 the company opened a US branch in Mahopac NY to assist and promote the distribution of Microgate products on the American market.

Thanks to the exceptionally high quality and reliability of its systems, Microgate currently occupies a position of leadership in all its areas of operations. The key products in the sports-medical field are devoted to motion analysis, sports performance analysis, and training (Optogait, Gyko, Optojump Next and the range of devices in the Witty family of indicator systems).



Motekforce Link provides innovative products for treatment of movement disorders in clinical rehabilitation. Our high-quality rehabilitation products with real-time feedback use augmented/virtual reality techniques combined with motion platforms, instrumented treadmills and motion-capture to study/treat balance and locomotion disorders. By combining these technologies our products are able to study and train (impaired) human movement. The D-Flow software integrates all system components and makes the synchronized data streams available in real-time to develop and run custom build applications tailored to your research protocols.

All these technologies were already available in our CAREN and GRAIL systems and can now be purchased separately in our modular M-Gait system. This allows you to build a gait lab that perfectly suits your research requirements. Start your lab with an instrumented dual-belt treadmill and the D-Flow software and extend the system with various system enhancements to increase the clinical and research possibilities. You can integrate 3D motion capture, fast pitch and/or sway of the treadmill, EMG, body weight support and/or an interactive Virtual Reality system.



myon myon is a Swiss company that, since the foundation in 2009, has established a world-wide reputation for quality electromyography systems (EMG) that are very easy to use and still perfectly fulfill the high measurement standards required by international scientific

societies.

These are the key benefits of the myon m320 and m320S EMG and Sensor systems:

- Wireless: easy and fast to apply sensors and electrodes
- Easy to use: it either charges or measures and there are no buttons to press
- Fixed, low latency: measure in real time, synchronous with other systems
- Small, lightweight sensors: comfortable for the patient
- 10 hours of battery life: measure all day, recharge at night
- Not just EMG: we also offer wireless accelerometers, goniometers and foot switches
- Powerful software: do your recording and analysis in just a few mouse clicks
- Superb support: we're there for you if you have questions or concerns



Noraxon continues its 25 year tradition of manufacturing excellence for Evidence-Based Biomechanics. We take pride in being recognized in the market place as the Gold Standard across the biomechanical assessment spectrum. Our patent-protected and FDA approved technology includes EMG, video capture, pressure/force and 3D motion analysis. Combining this hardware with the most powerful data acquisition and analysis software ever specifically developed for life sciences, MR3 (myoResearch 3), allows for straight-forward, synchronous and automated data collection. MR3 is built on a modular platform that offers users the flexibility to work with a single technology or a fully equipped biomechanical technology suite. Synchronization is automated across all data recording and processing of EMG, video, 3D (IMU) kinematics, multiple pressure and gait systems, and any other (3rd party) device that streams an analog signal. Noraxon's solutions improve the research and diagnostics

workflow by giving users access to real time data, accurate biofeedback, and extensive automated reporting and analysis capabilities all while significantly reducing set up and processing time.



novel is the specialist in the development of load distribution measurement systems. With more than 30 years of experience, our scientists and engineers set the benchmark for the accuracy and reliability of load distribution measurement. Our team plays a leading role in expanding the systems' application area.

novel's has developed various different measurement systems, which include the emed® pedography platform providing a barefoot measurement for foot diagnostics and the analysis of foot functions, the pedar® in-shoe measuring system for the evaluation of local forces between foot and shoe, and the pliance® systems that identify the load distribution on soft surfaces and 3-D areas. novel's latest innovation is the pedoped® load monitoring device which accurately measures the normal plantar force detected inside the shoe during all static and dynamic activities.

Today, well-known major companies and prominent research institutions in medicine, biomechanics and industry all around the world rely on novel's technology. We are your partner for highly innovative spine and orthopedic technology.



Orthovative is specialized in the sale of innovative spine and orthopedic technology, focused on spine surgery and orthopedics. In the sector of paediatrics we supply special designed implants and instruments for infants and kids. We have close partnerships with leading companies

and offer our customers:

- Individual service
- Absolutely reliable support
- Interesting training programs

Orthovative was founded in 2011 and is based in Gmund in Southern Germany. We position ourselves as interface between the international and the German market.



prophysics, established in 1996, is a Switzerland-based company offering high-quality measurement equipment for the 2D and 3D analysis of motion as well as Force Plates, EMG and other biophysical signals. Users are found in Life Science, but also in Engineering and Animation. Working with industry leading companies such as Vicon, AMTI, Contemphas and Zebris, prophysics has established a strong user base and a reputation for excellent end-user support in the German-speaking Europe.



QUALISYS is a leading, global provider of products & services based on optical motion capture. The core technology of Qualisys products has been developed in Sweden since 1989.



Ultraflex®, exclusively represented in Europe by Dirame Ortho, is worldwide market leader of dynamic components which are integrated in custom-made orthoses. These orthoses address patients who are suffering from range of motion deficits associated or not with spasticity.

We can distinguish 2 types of components:

1. Therapeutic components for postural upper- and lower limbs orthoses to improve or maintain the patients' potential in terms of ROM and spasticity. 20 years experience makes the new Ultraflex® ONE™ the most complete joint to meet the requirements of the actual treatments, such as botulinum toxin. This hybrid joint offers unlimited, adjustable dynamic and static correction.
2. Functional components for ankle and knee orthoses for daily use. Their goal is to correctly position the limb within the patients' potential in order to improve their gait cycle. These ADR™-(Adjustable Dynamic Response™) components allow the practitioner to precisely adjust the resistance in dorsi- and plantar flexion in patients with extension and flexion gait deficits. This way all natural rockers are respected and patients' muscles are used correctly on the right moment.

We are pleased to welcome you at our booth no. 3, ground level.



Velamed has been founded in 2005 with the goal to introduce technically innovative medical products of leading international manufacturers of biomechanics and sensor systems to the European market. The current product line includes market leading developments of the main areas of biomechanics. Also Velamed has specialized in professional planning and realization of biomechanical laboratories. In various public-funded research and product related development projects Velamed acts as industry partner for universities.



Vicon delivers highly accurate 3D motion capture systems for use in gait analysis. Nearly 400 clinical gait labs world-wide use Vicon technology. Its flagship cameras Vicon Vantage, offers the highest resolution, frame rates and accuracy available, allowing detailed motion capture in almost any environment. Bonita is Vicon's next generation camera, combining size, power, and price performance into one amazing solution.

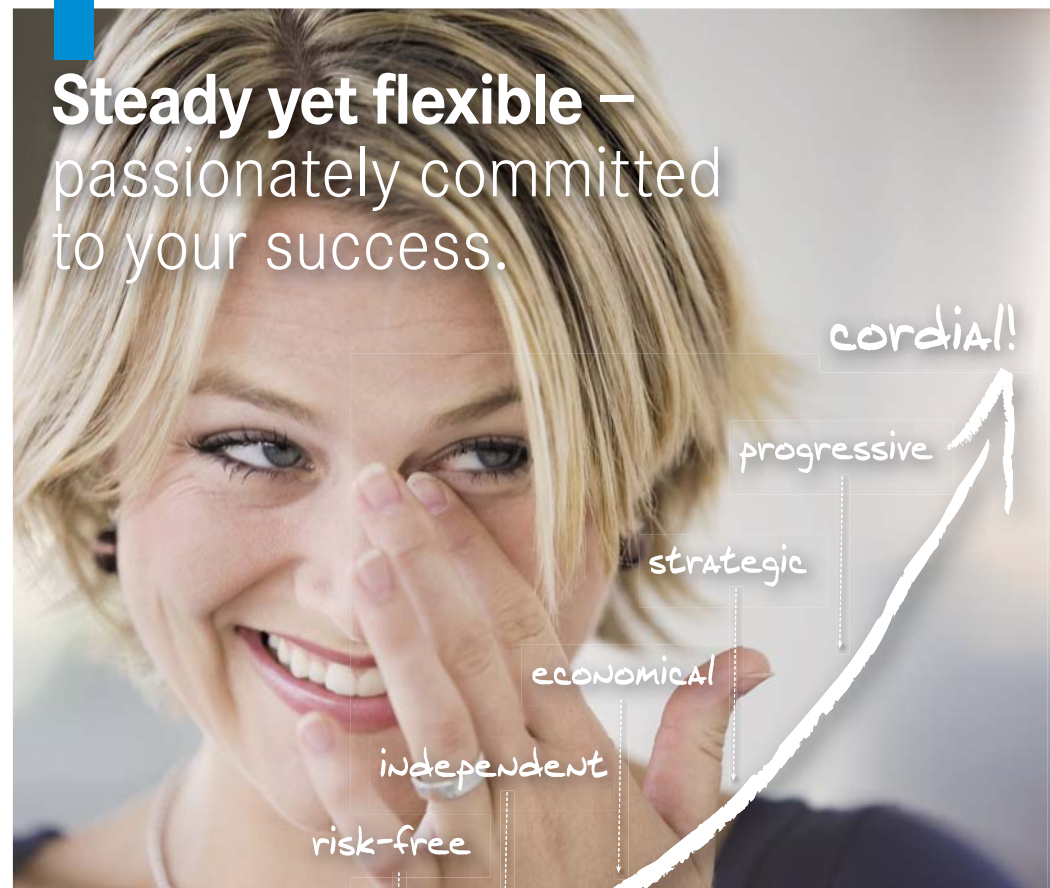
Vicon was established in Oxford, UK, in 1984 and is now a subsidiary of the Oxford Metrics Group Plc. Some of Vicon's global clients include: University of Vienna; Nuffield Orthopaedic Centre; University of Brussels; Northumbria University; Guy's and St Thomas' Hospital; Katholieke Universiteit Leuven; Amsterdam Medical Centre; and Humboldt Universität zu Berlin. For more information please visit www.vicon.com.



zebris Medical GmbH looks back on a history of more than 25 years in the manufacturing of professional measuring systems for 3D movement analysis and force distribution measurement.

The innovative systems for measuring human motion sequences find application in medical practices, clinics, scientific institutions as well as in orthopedic and neurologic rehabilitation facilities. From the location in Isny, zebris acts on an international level and is represented by distributors in 34 countries.

Steady yet flexible – passionately committed to your success.



Berlin Düsseldorf Freiburg Wiesbaden

Four locations – one point of view: customer proximity.

Enjoying exceptional relations in all relevant areas, we activate and combine competence – on-site and throughout Europe. Many years of experience have made us experts in the field of congress organisation, with valuable con-

tacts and outstanding capabilities in constructive teamwork. Given the great responsibility, every function is a position of trust. Mutual respect is the essential ingredient to ensure understanding among everyone involved.



www.intercongress.de

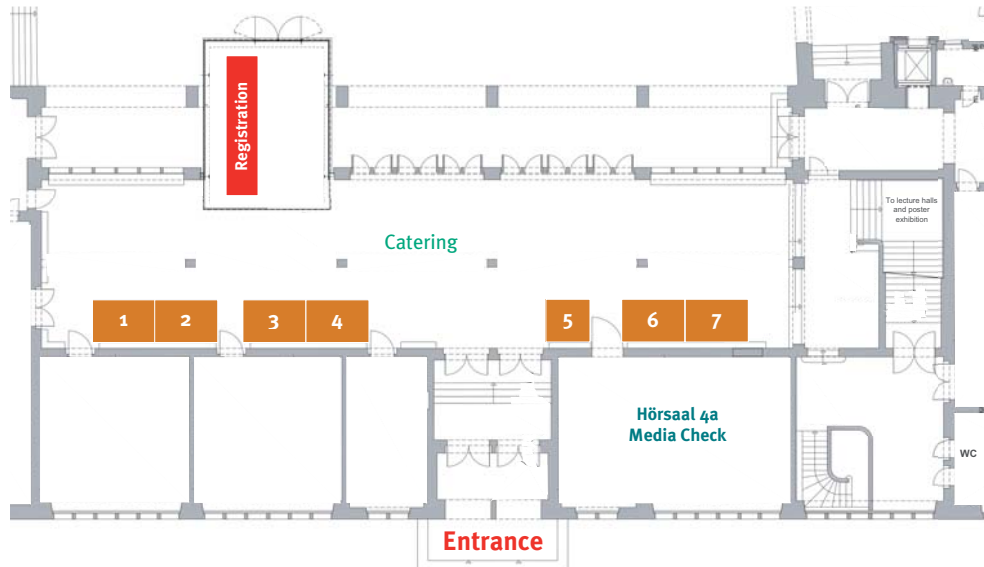


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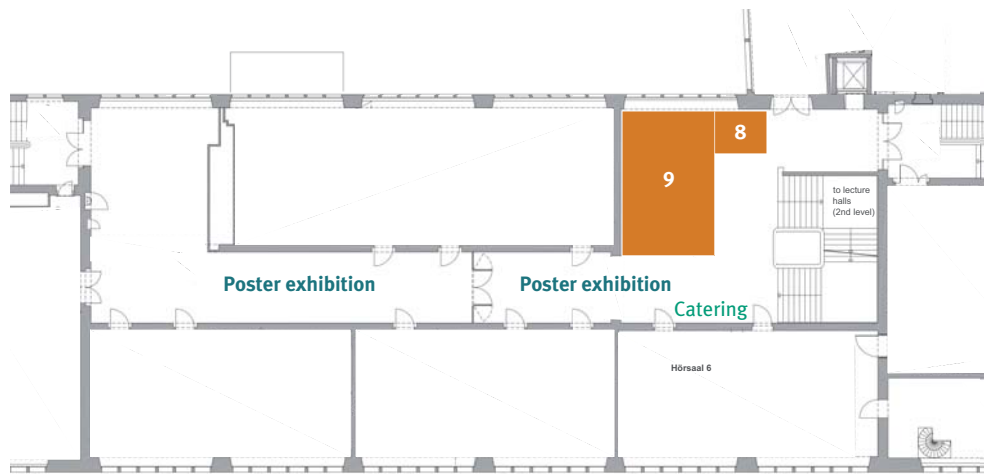
inspires. effects!

Keynote Speakers
Thursday, 10 September 2015
Friday, 11 September 2015
Saturday, 12 September 2015
Events
ESMAC Society
Partners & Exhibitors
General Information
Faculty

Neue Universität Heidelberg



Ground floor



1st floor



2nd floor

Exhibitors

- | | |
|---|--|
| 1 AKU Societies | 11 novel gmbh |
| 2 Made for Movement GmbH | 12 Cometa Systems |
| 3 Ultraflex by DIRAME Ortho | 13 CODAMOTION Charnwood Dynamics Ltd. |
| 4 Motekforce | 14 Gait up |
| 5 DIERS International GmbH | 15 FIOR & GENTZ GmbH |
| 6 ORTHOVATIVE GmbH | 16 MICROGATE Srl |
| 7 zebris Medical GmbH | 17 Noraxon Inc.
Qualisys AB |
| 8 myon AG | 18 Velamed GmbH
Bertec Inc. |
| 9 Vicon Motion Systems
Prophysics | |
| 10 CONTEMPLAS GmbH | |

Registration

Main Congress

Members	520,00 EUR
Non-Members	570,00 EUR
Students	370,00 EUR
Day ticket (only onsite)	300,00 EUR

Packages

Gait Course/All Seminars & Main Congress (Members)	980,00 EUR
Gait Course/All Seminars & Main Congress (Non-Members)	1090,00 EUR
Gait Course/All Seminars & Main Congress (Students)	730,00 EUR

Online-Registration

www.esmac2015.com/registration

Meeting Language

English

Wifi Access

Net: uni-webaccess

User: rl2

Password: esmac#2015

Credits

The meeting was certified by the Doctor's chamber of Baden-Württemberg with 18 Credits (Cat. B)

Venue

The meeting takes place at the new university building which was built in the early 1930's. Above the entrance is a statue of Athena, Greek goddess of wisdom, with the caption "To the living spirit". The medieval tower called the "Hexenturm" combines the three wings of the building which form a welcoming patio for student work groups and leisure time.



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Address: Neue Universität Heidelberg
Grabengasse 3–5, 69117 Heidelberg

By Bus

From Heidelberg central station (Hauptbahnhof) please take the bus RNV 32 in the direction of Heidelberg, Universitätsplatz. Leave the bus at Heidelberg, Universitätsplatz. Follow the Grabengasse up to Grabengasse 3–5/ Neue Universität Heidelberg. The journey takes about 15–20 minutes.

Accommodation

To your convenience we have contacted hotels within Heidelberg that are suitable to our congress visitors. Please use the following link to receive the special offers for the selected hotels: www.esmac2015.com/accommodation

There is also the possibility of low budget accommodations such as youth hostels. For booking a youth hostel please follow the link: www.jugendherberge-heidelberg.de

Travel Information

Arriving by road

Heidelberg can be reached from Northern and Southern Germany via the A5 expressway. After reaching the Heidelberger Kreuz, it is recommended to take the A656 in the direction of Heidelberg.

Drivers from Eastern Germany are advised to take the A6 expressway in the direction of Frankfurt. After reaching the Heidelberger Kreuz, it is recommended to take the A656 in the direction of Heidelberg.

Coming from Western Germany via the A6 expressway it is recommended to leave the A6 at the Mannheimer Kreuz in the direction of Heidelberg.

Arriving by air

Heidelberg does not have its own airport, but the city is easy to reach from Frankfurt/Main airport (approx. 60 minutes by car or train) and Stuttgart airport (approx. 70-90 minutes by car or train).

Diverse airport shuttles depart every 30–90 minutes from Frankfurt airport to Heidelberg. One way ticket costs are EUR 24.00 each and EUR 44.00 for a return ticket. The tickets can be purchased directly at the shuttle service. The route between Heidelberg and Frankfurt airport is operated by the cooperation partner Busworld International of Lufthansa. You will reach your destination quickly and conveniently in comfortable 22- or 8-seater vehicles. Please find more Information via: <http://www.lufthansa.com/uk/en/Airport-Shuttle-Heidelberg>

There is the option to take the train within the Frankfurt airport terminal to ride to Frankfurt main station 'Hauptbahnhof' and then change trains in Mannheim main station "Hauptbahnhof". The local tram S1 will go the entire distance to the Heidelberg University Hospital Department of Orthopaedics, station of exit "Schlierbach, Orthopädische Klinik". Duration approx. 2 hours.

Organise your flight with special offers by Lufthansa
(more information at www.esmac2015.com/rail-fly-offers/)

Arriving by train

Heidelberg's main train station 'Hauptbahnhof' is located in the city centre and provides an ICE (InterCityExpress) and IC/EC (InterCity/EuroCity) connection to regional, as well as major cities. Intercongress offers a customized flat-rate price for congress participants. The ticket facilitates individual transport to and from the venue.

Organise your train journey with special offers by Deutsche Bahn
(more information at www.esmac2015.com/rail-fly-offers/)

Transportation within the city

The public transportation in Heidelberg is used as the main form of transportation within the city. The Bismarckplatz is the center hub leading to diverse directions of Heidelberg as well as to the congress venue. Tickets can be purchased at ticket machines or at the main train station. More information is given at www.vrn.de and www.rnv-online.de.

Additional source of information

<http://www.deutschebahn.com/en/start.html>

City Information

Highlights in the city of Heidelberg

The beautiful town offers various tourist attractions which are definitely worth visiting for the young and the young at heart.

- Heidelberg castle
- Alte Brücke
- Historic churches and examples of great architecture
- Zoo



© Schloss und alte Brücke – HD Marketing

Guided Tours

Learn all about Heidelberg either on foot, by bus or even with a Segway. The tours have special focuses or themes and provide valuable information and entertainment:

- Historic centre of Heidelberg
- Bus tours including a castle visit
- Heidelberg University
- Culinary Heidelberg
- Segway Tour



© StadtSafari – HD Marketing

Several boat tours

Discover the beautiful city of Heidelberg from the water and enjoy the charming "Neckartal" on board the vessels "Weisse Flotte", the solar ship "Neckarsonne" or the Neckar Ferry.



© Neckarfahrt – HD Marketing

For further information and bookings, please feel free to visit the website of the tourism agency: www.heidelberg-marketing.com

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