

Scientific Program of the

12th Vienna International Workshop on Functional Electrical Stimulation



Vienna, Austria, September 07th-09th, 2016

<http://fesworkshop.org>

GENERAL INFORMATION

The triennial "Vienna International Workshop on Functional Electrical Stimulation" provides a platform for researchers to present and discuss their recent work whilst visitors can expect a representative and actual overview of the state of the art of FES.

Conference venue

Medical University of Vienna "Van Swieten Saal"
Van Swieten Gasse 1a
1090 Vienna
<http://vanswietensaal.meduniwien.ac.at>

National organizers

Center for Medical Physics and Biomedical Engineering
Medical University of Vienna and the
"FES group of the Austrian Society for Biomedical Engineering"
M.Bijak, H.Lanmüller, W.Mayr, M.Pichler, D.Rafolt

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Conference language

The official language of the conference is English

Dates

Welcome Cocktail 07.Sept.2016 (19:00-21:00)
Scientific program from 08.Sept.2016 (09:00)
to 09.Sept.2016 (17:30)

Registration fee

Conference* € 470,00 / € 440,00*
Day Ticket** € 150,00
Pre Conference Course € 150,00

* Members of ÖGBMT or IFESS

** Does not include social activities in the evening

GENERAL INFORMATION

Accompanying persons

<i>Welcome cocktail</i>	€ 30,00	07.09.2016
<i>Conference Dinner</i>	€ 110,00	08.09.2016

Methods of payment

*Bank transfer, Credit card transfer, PayPal
or directly at the registration desk (credit card)*

The registration fee for the whole conference includes

*Welcome cocktail
Coffee breaks, Lunch
Conference dinner
Conference proceedings*

Day tickets include: Scientific program, coffee breaks, lunch and conference proceedings

Registration Desk

*Open throughout the conference:
Wednesday, 07.09. (18:30–21:00)
Thursday to Friday 08.-09.09. (08:00-14:00)*

Conference Dinner

*08. Sept. 2016
Weinhof Zimmermann
Mitterwurzgasse 20, 1190 Vienna
www.weinhof-zimmermann.at*

Commercial exhibition

Facilities for exhibition and commercial product presentations are available - interested companies please contact the secretary.

GENERAL INFORMATION

Oral presentation

*Time: 15 minutes
(10 minutes presentation and 5 minutes discussion)*

Presentation media

*Beamer and PC for Power Point presentations
(provide a CD or USB memory stick)*

Speakers should submit their media 30 minutes prior to the start of their session at slide desk.

Poster presentation

The posters should be exhibited at the assigned poster board during the whole conference. All participants are encouraged to contact the authors during the coffee breaks.

Paper size A0, portrait.

Proceedings of the conference

The proceedings with full length papers will be available at the beginning of the workshop.

Social program

*Wednesday, 07.09.2016, (19:00 – 21:00)
Welcome Cocktail at the conference venue “Van Swieten Saal”*

*Thursday, 08.09.2010, (19:00 – 23:00)
Conference Dinner t.b.a.”*

Detailed information

*Please find further information at the official conference homepage:
2016.fesworkshop.org*

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SCHAUER Thomas
SCHMOLL Martin
SPAICH Erika G.
VARGAS LUNA José Luis
VELTINK Peter
WILLAND Michael

Wednesday 07.09.2016

PCC 1

Pre-Conference Course 1

Mayr W. (Vienna, Austria)
Krenn M. (Vienna, Austria)
Dimitrijevic M. (Houston, USA)

09:00 - 12:00

Non invasive posterior root stimulation for assessment and modulation of spasticity and motor control

Transcutaneous stimulation of the lumbosacral spinal cord activates a subset of the same neuronal population as epidural spinal cord stimulation. Single stimuli elicit spinal reflexes in multiple lower limb muscles bilaterally in people with intact and altered CNS that can serve as test reflexes in neurophysiological studies. Current research investigates the applicability of continuous transcutaneous spinal cord stimulation in the rehabilitation of people with traumatic spinal cord injury (spasticity control, locomotor training). In the present workshop, we will present theoretical background, give a hands-on demonstration in an individual with intact CNS, and present pilot data of neuromodulation applications.

Location:

Center for Biomedical Engineering and Physics
Medical University Vienna
<http://2016.fesworkshop.org/pcc>

12:25-14:00

Lunch

PCC 2

Pre-Conference Course 2

Mayr W. (Vienna, Austria)
Krenn M. (Vienna, Austria)
Biowski P. (Vienna, Austria)

13:00 - 16:00 FES of Denervated Muscles – An Essential Therapeutic Option after Peripheral Nerve Lesion

The workshop is designed as a hands-on workshop with a comprehensive introduction on physiological, clinical and technical basics, safety issues, handling of equipment and guidelines for supervised home based therapy. As FES of denervated muscles differs fundamentally from classical neuromuscular FES the main particularities are addressed in an open interactive discussion. The goal is to train qualified medical staff to a level that allows confident, safe and efficient clinical application of this novel method, and providing them a clear view on achievable therapeutic benefits, limitations and potential specific risks.

Location: Center for Biomedical Engineering and Physics
Medical University Vienna
<http://2016.fesworkshop.org/pcc>

18:30 Welcome Cocktail
Location: Van Swieten Saal

Thursday 08.09.2016

Opening 09:00 Welcome

Key **Keynote Lecture:**
Chairperson: Carraro U. (Padova, Italy)

09:15 – 10:15 Jarvis J. (Liverpool, GB)
NEUROMUSCULAR CELL BIOLOGY AND 'OMIC TECHNOLOGIES:
THE BASICS

10:15-10:45 Coffee Break

**Workshop
1**

MED[®]EL *Workshop: Functional Rejuvenation in Aging*

Chairpersons: Gugatschka M. (Graz, Austria)
Lindenthaler W. (Vienna, Austria)

- 10:45 Carraro U. et al (Padova, Italy)
THE AGING MUSCLE: CHANGES IN MUSCLE MORPHOLOGY – A
SUMMARY OF THE CURRENT KNOWLEDGE
- 11:15 Kern H. (Vienna, Austria)
HOW TO KEEP THE AGING MUSCLE HEALTHY (WITH FES)
- 11:45 Gugatschka M. et al (Graz, Austria)
CHRONIC NEUROSTIMULATION FOR TREATMENT OF AGE RELATED
LARYNGEAL MUSCULAR ATROPHY
- 12:05 Karbiener M. (Graz, Austria)
STUDYING THE EFFECTS OF FUNCTIONAL ELECTRICAL STIMULATION
ON THE THYRO-ARYTENOID MUSCLE IN RATS

12:25-14:00 Lunch

**Workshop
2**

MED[®]EL *Workshop: Electrical Stimulation in
Neuromuscular Disorders*

Chairpersons: Mayr W. (Vienna, Austria)
Kaniusas E. (Vienna, Austria)

- 14:00 Kaniusas E. et al (Vienna, Austria)
OPTIMIZATION OF WAVEFORM SHAPES FOR ELECTRICAL
NEUROMUSCULAR STIMULATION BASED ON CONDUCTIVE AND
DISPLACEMENT MEMBRANE CURRENTS
- 14:20 Mayr W. (Vienna, Austria)
OPTIMISED STIMULATION PULSE SHAPES FOR SELECTIVE
STIMULATION OF DENERVATED MUSCLES IN REGIONS WITH
SENSIBILITY
- 14:40 Schneider-Stickler B. et al (Vienna, Austria)
METHOD FOR SELECTIVE SURFACE STIMULATION OF DENERVATED
MUSCLES IN THE LARYNX
- 15:00 Volk G.F. et al (Jena, Germany)
DETERMINING OPTIMAL SETTINGS FOR SELECTIVE SURFACE
STIMULATION IN ORDER TO RECRUIT PARALYZED FACIAL MUSCLES
UNDER NON PAINFUL CONDITIONS
- 15:20 Schmoll M. (Vienna, Austria)
PULSE WIDTH OPTIMISATION

15:40-16:10 Coffee Break

**Workshop
3**

RETRAINER *Workshop with Hands on*

Chairpersons: Ferrante S. (Milano, Italy)
Schauer T. (Berlin, Germany)

- 16:10 Bulgheroni M. et al (Milano, Italy)
REACHING AND GRASPING TRAINING BASED ON ROBOTIC HYBRID ASSISTANCE FOR NEUROLOGICAL PATIENTS
- 16:25 Gföhler M. et al (Vienna, Austria)
THE RETRAINER ARM EXOSKELETON - A MODULAR LIGHTWEIGHT DEVICE THAT COMBINES ADJUSTABLE GRAVITY COMPENSATION, LOCKABLE JOINTS AND NEUROMUSCULAR ELECTRICAL STIMULATION
- 16:40 Ferrante S. et al (Milano, Italy)
THE RETRAINER CONTROL SYSTEM FOR SUPPORTING ARM FUNCTIONS
- 16:55 Crema A. et al (Lausanne, Switzerland)
THE RETRAINER HAND ORTHOSIS - AN EVENT-DRIVEN MODULAR LIGHTWEIGHT DEVICE THAT COMBINES CONTROLLED HAND-WRIST MOTION AND MULTI-ELECTRODE NEUROMUSCULAR STIMULATION
- 17:10 Hands on
- Poster Zajc J. et al (Vienna, Austria)
UNIFIED CONTROL INTERFACE OF MULTIPLE DEVICES FOR UPPER LIMB POST STROKE REHABILITATION
- 18:30 **Conference Dinner**

Friday 09.09.2016

Key

Keynote Lecture:

Chairperson: Sevcencu C. (Aalborg, Denmark)

- 09:00 – 09:45 Lukanovič A. (Ljubljana, Slovenia)
NEUROMODULATION IN THE TREATMENT OF PELVIC FLOOR DYSFUNCTIONS

Session 1

Basic Research

Chairpersons: Pečlin P. (Ljubljana, Slovenia)
Jarvis J. (Liverpool, GB)

- 09:45 Sevcencu C. et al (Aalborg, Denmark)
BLOOD PRESSURE RELATED NEURAL PROFILES EXTRACTED FROM PIG LEFT VAGUS NERVES USING AN INTERFASCICULAR ELECTRODE
- 10:00 Pečlin P. et al (Ljubljana, Slovenia)
CAPS IN AN ISOLATED SCIATIC NERVE OF A RAT ELICITED WITH SPECIFIC STIMULATING PULSES WITHOUT AND WITH BUPIVACAINE ANAESTHESIA
- 10:15 Werginz P. et al (Vienna, Austria)
NEURONAL ACTIVATION CHARACTERISTICS IN THE ELECTRICALLY STIMULATED RETINA DURING SUB- AND EPIRETINAL STIMULATION
- 10:30 Schmoll M. et al (Vienna, Austria)
IN VIVO MEASUREMENTS OF TENSION IN THE TIBIALIS ANTERIOR TENDON OF THE RAT USING A MINIATURE IN-LINE LOAD-CELL - PRELIMINARY RESULTS
- 10:45-11:15 **Coffee Break**

Session 2

Neuromodulation, Rehabilitation strategies

Chairpersons: Lukanovič A. (Ljubljana, Slovenia)
Dimitrijevic M. (Houston, USA)

- 11:15 Dimitrijevic M. (Houston, USA)
A BRIEF INTRODUCTION TO NEUROMODULATION
- 11:30 Hofstoetter U. et al (Vienna, Austria)
TRANSCUTANEOUS SPINAL CORD STIMULATION TO INDUCE
STANDING IN INDIVIDUALS WITH MOTOR COMPLETE SPINAL CORD
INJURY
- 11:45 Krenn M. et al (Vienna, Austria)
SENSORY INPUT WITH DIFFERENT RATES OF SUSTAINED ELECTRICAL
STIMULATION CAN MODIFY MOTOR OUTPUT OF THE HUMAN
LUMBOSACRAL SPINAL CORD
- 12:00 Vargas Luna J. et al (Reykjavik, Iceland)
STUDY OF THE EFFECT'S DURATION OF NON-INVASIVE TRANS-SPINAL
STIMULATION TO REDUCE CLONUS ACTIVITY IN PEOPLE WITH SCI
- 12:15 Anzinger-Weitmann M. et al (Vienna, Austria)
CA 2+ MODEL TO EXPLAIN LONG-TERM EFFECTS OF LOCOMOTION
IMPROVEMENT FROM PARAPLEGIC INDIVIDUALS DUE TO SPINAL
CORD STIMULATION
- 12:30 Weigel G. et al (Vienna, Austria)
TREATMENT OF CHRONIC NEUROPATHIC PAIN: FIRST CLINICAL
EXPERIENCE WITH PERIPHERAL NERVE STIMULATION (PNS)

12:45-14:15 Lunch

Key

Keynote Lecture:

Chairperson: Lanmueller H. (Vienna, Austria)
Rafolt D. (Vienna, Austria)

- 14:15 – 15:00 Podesser B. (Vienna, Austria)
ANIMAL RESEARCH IN FES

Session 3

FES Exercise

Chairpersons: Bersch I. (Nottwil, Switzerland)
Helgason T. (Reykjavik, Iceland)

- 15:00 Bersch I. et al (Nottwil, Switzerland)
ROBOTIC ASSISTED TRAINING IN COMBINATION WITH FUNCTIONAL
ELECTRICAL STIMULATION TO IMPROVE LOWER LIMB FUNCTION
AFTER SPINAL CORD INJURY
- 15:15 Thorsen R. et al (Milano, Italy)
A CLINICAL TRIAL ON ARM REHABILITATION USING TASK ORIENTED
THERAPY AND MYO-ELECTRICALLY CONTROLLED FES (MECFES)
- 15:30 Szecsi J. et al (Munich, Germany)
LOW POWER OUTPUT OF FES CYCLING IN SUBJECTS WITH SCI, A
BIOMECHANICAL VIEWPOINT
- 15:45 Mravcsik M. et al (Pecs, Hungary)
FES DRIVEN LOWER LIMB CYCLING BY FOUR AND EIGHT CHANNEL
STIMULATIONS – A COMPARISON IN A CASE STUDY
- 16:00 Schils S. et al (River Falls, USA)
THE COMPARISON OF THE USE OF FUNCTIONAL ELECTRICAL
STIMULATION (FES) FOR MOBILITY IN HUMAN SPINAL CORD INJURY
AND FOR USE IN MUSCLE SPASM AND ATROPHY REHABILITATION IN
HORSES
- 16:15 Valtin M. et al (Berlin, Germany)
ONLINE ASSESSMENT OF VOLITIONAL MUSCLE ACTIVITY FROM
STIMULATION ELECTRODES IN A DROP FOOT NEUROPROSTHESIS

16:30-17:00 Coffee Break

Session 4

Technologies, Engineering, Sensors

Chairpersons: Troyk P. (Liverpool, GB)
Keller T. (Donostia, San Sebastian)

- 17:00 Troyk P. et al (Chicago, USA)
THE INTRACORTICAL VISUAL PROSTHESIS (ICVP) SYSTEM
- 17:15 Bijak M. et al (Vienna, Austria)
IMPLANTABLE ELECTRICAL STIMULATOR FOR SMALL ANIMALS:
PRELIMINARY RESULTS
- 17:30 Lanmüller H. et al (Vienna, Austria)
IMPLANTABLE ELECTRICAL STIMULATOR OPTIMIZED FOR ANIMAL
STUDIES
- 17:45 Kast C. et al (Vienna, Austria)
MODULAR MULTI-CHANNEL REAL-TIME BIOSIGNAL AND SENSOR
INTERFACE FOR MOVEMENT CONTROL APPLICATIONS
- 18:00 Nalbach M. et al (Vienna, Austria)
FREQUENCY CHARACTERISTICS OF POWER COILS UNDER PRACTICAL
FMS CONDITIONS
- 18:15 Gondola H. et al (Vienna, Austria)
MAGNETIC FIELD INDUCED HEATING OF METAL IMPLANTS DURING
FMS ON THE EXAMPLE OF AN ARTIFICIAL HIP JOINT
- 18:30 **Good Bye**

We acknowledge the support by:



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