



MEDICAL UNIVERSITY
OF VIENNA

Scientific Program

15th Vienna International Workshop on Functional Electrical Stimulation



30 years IFESS Anniversary



Vienna, Austria, September 15.-18. 2025

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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

[Van Swieten Saal der Medizinischen Universität Wien](#)

Van-Swieten-Gasse 1a

A-1090 Vienna

National organizers

Medical University of Vienna

and

Austrian Society for Biomedical Engineering

"FES group of the Austrian Society for Biomedical Engineering"

M.Bijak , M. Schmoll, M.Pichler, W.Mayr

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Conference language

The official language of the conference is English

Dates

<i>Pre Conference Course</i>	<i>15. Sept. 2025</i>	<i>09:00 - 17:00</i>
<i>Come together</i>	<i>15. Sept. 2025</i>	<i>17:30 - 19:30</i>
<i>Scientific program</i>	<i>16. Sept. 2025</i>	<i>08:30 - 17:00</i>
<i>Cybersportsday 2025</i>	<i>16. Sept. 2025</i>	<i>- 19:30</i>
<i>Scientific program</i>	<i>17. Sept. 2025</i>	<i>08:30 - 16:30</i>
<i>Conference Dinner</i>	<i>17. Sept. 2025</i>	<i>18:00 - 23:00</i>
<i>Scientific program</i>	<i>18. Sept. 2025</i>	<i>08:30 - 14:00</i>

Registration Desk

Open throughout the conference

Conference Dinner

*17. Sept. 2025
Waldschenke-Staar
3001 Mauerbach, Hainbuch 1
waldschenke-staar.at*

Oral presentation

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

Presentation media

*Beamer and PC for PowerPoint presentations
(USB memory stick)*

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

Detailed information

Please find further information at the official conference homepage:

<https://mpbmt.meduniwien.ac.at/fesws2025>

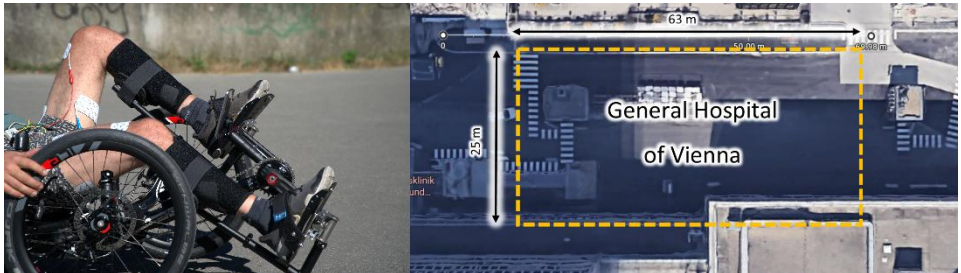
ViennaFES | Cybersportsday 2025

Tuesday, 16.09.2025

*For the very first time, this conference will feature a new highlight: a **FES-Cycling Race**. In this exciting event, individuals with spinal cord injury will compete head-to-head on a flat track in a real-life, over-ground race – powered solely by their paralyzed legs re-activated through FES.*

This race is more than just a competition. Beyond showcasing athletic performance, it serves as a platform to foster connections, exchange experiences and inspire innovation. Our goal is to raise awareness for the transformative potential of FES technology, outside the scope of traditional therapeutic applications.

Be part of this inspiring event – and discover the exciting possibilities of FES in sports!



Information

19:15 - 19:30h : Medal Ceremony

Date: 16.09.2025
Location: General Hospital of Vienna
(AKH Michelbeuern)
N48.219576,
E16.344883

Schedule

14:00 - 16:00h : Meet the Teams & Testruns
16:00 - 18:00h : Qualifications
18:30 - 19:00h : Finals



Monday 15.09.2025

09:00-17:00 Pre-Conference Workshop
17:30-19:30 Welcome Cocktail

Tuesday 16.09.2025

08:20 Opening

Key

Keynote Lecture

Chairperson: Jonathan Jarvis (Liverpool, United Kingdom)

08:30 Stanley Salmons (Liverpool, UK)
PARADIGM SHIFTS: THE FOUNDATIONS OF FUNCTIONAL ELECTRICAL
STIMULATION

Ceremony

30 years IFESS

09:15

Host: Simona Ferrante, President of IFESS (Milan, Italy)

10:15-10:45 Coffee Break

Session 1

Clinical applications of FS

Chairpersons: Tamsyn Street (Salisbury, United Kingdom)
Werner Girsch (Graz, Austria)

- 10:45 Tamsyn Street et al (United Kingdom)
QUALITY OF LIFE AND PATIENT REPORTED OUTCOME
MEASURES FOLLOWING THE USE OF FUNCTIONAL ELECTRICAL
STIMULATION FOR WALKING POST STROKE
- 11:00 Erika G. Spaich et al (Denmark)
EFFECT OF ELECTRICAL STIMULATION ON THE TIMING OF THE
PREPARATORY PHASE OF GAIT INITIATION IN PARKINSON'S
DISEASE
- 11:15 Ugo Carraro et al (Italy)
EFFECTIVENESS OF FES X DDM AFTER TWENTY YEARS OF
PERMANENT DENERVATION AND DEGENERATION OF HUMAN
MUSCLES
- 11:30 Christina Buchgeher et al (Austria)
CLINICAL IMPLICATIONS OF ELECTRICAL STIMULATION IN A
HOME-BASED TREATMENT SETTING FOR PATIENTS WITH
FACIAL NERVE PARALYSIS TO STOP DENERVATION ATROPHY
- 11:45 Tamsyn Street (United Kingdom)
A RANDOMISED, SHAM-CONTROLLED, REMOTELY CONDUCTED,
PROOF OF PRINCIPLE STUDY OF ABDOMINAL FUNCTIONAL
ELECTRICAL STIMULATION (ABFES) FOR BOWEL MANAGEMENT
IN SPINAL CORD INJURY (SCI)
- 12:00 Ines Bersch et al (Switzerland)
THE EFFECT OF NEUROMUSCULAR ELECTRICAL STIMULATION
ON BOWEL MANAGEMENT IN PEOPLE WITH CHRONIC SPINAL
CORD INJURY
- 12:15 Benjamin Forrest et al (United Kingdom)
A RETROSPECTIVE ANALYSIS OF ABFES IN TREATING AND
MANAGING CONSTIPATION IN INDIVIDUALS WITH
NEUROLOGICAL IMPAIRMENT

12:30 Janez Rozman et al (Slovenia)
STIMULATION OF NEUROVASCULAR BUNDLES DURING ROBOT-
ASSISTED RADICAL PROSTATECTOMY

12:45-13:45 Lunch

Session 2

Afferent Nerve Stimulation

Chairpersons: Winfried Mayr (Vienna, Austria)
Ines Bersch-Porada (Nottwil, Switzerland)

13:45 Werner Girsch et al (Austria)
TREATMENT OF CHRONIC NEUROPATHIC PAIN WITH
PERIPHERAL NERVE STIMULATION

14:00 Milana Mileusnic et al (Austria)
CLINICAL ADVANCES IN FULL BODY NEUROMODULATION TO
TREAT SPASTIC MOTOR DISORDER AND CHRONIC PAIN

14:15 Rebecca Grenfell et al (Australia)
FUNCTIONAL IMPACT OF THE EXOPULSE MOLLII SUIT IN SPG4
HEREDITARY SPASTIC PARAPLEGIA: A SINGLE-SUBJECT AB CASE
STUDY

14:30 Sarah Massey et al (United Kingdom)
OPTIMAL PARAMETERS FOR LOWER LIMB AFFERENT NERVE
ROOT ACTIVATION USING TRANSCUTANEOUS SPINAL CORD
STIMULATION IN HEALTHY ADULTS.

14:45 Anna Patarraia et al (Austria)
HOME-BASED TRANSCUTANEOUS ELECTRICAL NERVE
STIMULATION FOR IDIOPATHIC SENSORY POLYNEUROPATHY: A
PERSONALIZED APPROACH

15:00 Dibya Chowdhury et al (Austria)
REAL-TIME R -PEAK PREDICTION IN ECG FOR CARDIAC-GATED
AURICULAR VAGUS NERVE STIMULATION

15:15-15:45 Coffee Break

Session 3

FES-Technology

Chairpersons: Nick Donaldson (London, UK)
Thomas Schauer (Berlin, Germany)

- 15:45 Javier Sáez et al (Chile)
DESIGN PARAMETERS OF CONCENTRIC ELECTRODES: A
SIMULATION STUDY TO OPTIMISE NON-INVASIVE FUNCTIONAL
ELECTRICAL STIMULATION
- 16:00 Kevin Schuh et al (Austria)
LOW-RESISTANCE COST-EFFICIENT INTERFACING FOR
NEUROSTIMULATION NEEDLES BASED ON PRINTED CIRCUIT
BOARD TECHNOLOGY
- 16:15 Siobhan Mackenzie Hall et al (United Kingdom)
AI ELECTRODE AND STIMULUS DESIGN FOR FES RESEARCH: A
PILOT STUDY
- 16:30 Hany Shaker et al (Egypt)
COST-EFFECTIVE REMOTELY FULLY-CONTROLLED ELECTRICAL
STIMULATOR FOR SKELETAL MUSCLES REHABILITATION
- 16:45 Hermann Lanmüller et al (Austria)
INCREASING THE RELIABILITY OF AN IMPLANTABLE PULSE
GENERATORS FOR SMALL AND LARGE LABORATORY ANIMALS
- 17:00 Hany Shaker et al (Egypt)
TOWARDS A SAFE LONG-TERM IMPLANTABLE ELECTRICAL
STIMULATION: A HIGH-EFFICIENCY CHARGE BALANCER DESIGN

17:15-19:45 ViennaFES Cybersports 2025

Wednesday 17.09.2025

Key

Keynote Lecture

Chairperson: Thomas Stieglitz (Freiburg, Germany)

08:30

Stanisa Raspopovic (Vienna, Austria)
HUMAN-MACHINE INTERFACING FOR HEALTH BENEFITS

Session 4

Sensory Restoration

Chairpersons: Stanisa Raspopovic (Vienna, Austria)
Eugenius Kaniusas (Vienna, Austria)

09:10

Michael Handler et al (Austria)
COMPUTER SIMULATION OF COMBINED
VESTIBULAR/COCHLEAR IMPLANT STIMULATION FOR THE
ANALYSIS OF CROSS-TALK AND NEURONAL RESPONSES

09:25

Laurin Xaver Koppenwallner et al (Austria)
FOCAL STIMULATION OF RETINAL GANGLION CELLS BY PULSE
DURATION MODULATION AND CURRENT STEERING

09:40

Klaus Peter Koch et al (Germany)
A FIRST APPROACH TO PHASE-MODULATED INTERFERENCE
STIMULATION FOR GENERATING MOVING TACTILE PERCEPTION

09:55-10:25

Coffee Break

Session 5

Methodological Insights

Chairpersons: Matthias Krenn (Mississippi, United States)
Christine Azevedo (Montpellier, France)

- 10:25 Hazzira Ameerah Safin Hashim et al (Malaysia)
ULTRASOUND ASSESSMENT OF FOREARM MUSCLE CHANGES
FOLLOWING FES IN SARCOPENIC ELDERLY: PRELIMINARY
RESULTS OF A FEASIBILITY STUDY
- 10:40 Nur Azah Hamzaid et al (Malaysia)
MUSCLE OXYGENATION-BASED CLASSIFICATION OF SPINAL
CORD INJURY DURING FES USING NIRS AND MACHINE
LEARNING
- 10:55 Ellen Huld A. Þórðardóttir et al (Denmark)
INVESTIGATING PREDICTORS OF RECOVERY AFTER SPINAL
CORD INJURY: A STATISTICAL APPROACH TO SECONDARY
INJURY AND CLINICAL OUTCOME ANALYSIS
- 11:10 Sandra Dorfer et al (Austria)
RESPIRATION-DRIVEN CLOSED-LOOP MODULATION OF
BINAURAL BEATS
- 11:25 Matthias Krenn et al (United States)
ELECTRICAL PRECONDITIONING OF DENERVATED MUSCLE
PRIOR TO NERVE TRANSFER: A FEASIBILITY STUDY IN A NON-
HUMAN PRIMATE MODEL
- 11:40 Jan Namysl (Poland)
COUPLING FES AND DYNAMIC SURFACE ELECTROMYOGRAPHY:
ADVANCING NEUROREHABILITATION
- 11:55 Ellen Huld A. Þórðardóttir et al (Denmark)
EFFECTS OF INTERNAL AND EXTERNAL COOLING ON
TEMPERATURE REGULATION FOLLOWING SPINAL CORD INJURY:
A MATHEMATICAL SIMULATION-BASED STUDY
- 12:10-13:10 **Lunch**

Session 6

FES-Cycling

Chairpersons: Martin Schmoll (Vienna, Austria)
Lynsey Duffell (London, United Kingdom)

- 13:10 Stephan Baglikow et al (Germany)
REAL-TIME BAYESIAN OPTIMIZATION OF FES CYCLING
- 13:25 Nick Donaldson et al (United Kingdom)
ADDING IMPOSED ANKLE MOTION TO FES CYCLING
- 13:40 Mariann Mravcsik et al (Hungary)
FES-INDUCED CHANGES IN EXCITABILITY OF DENERVATED
MUSCLES IN FLACCID PARAPLEGIA - CASE STUDY
- 13:55 Isabelle Rösler et al (Austria)
DEVELOPMENT OF MODELS TO ESTIMATE REALISTIC KEY
PERFORMANCE INDICATORS ON A FES-CYCLING-ERGOMETER
- 14:10 Tiago Coelho-Magalhães et al (France)
OPTIMAL CONTROL FRAMEWORK FOR PERSONALIZED FES-
CYCLING IN INDIVIDUALS WITH SPINAL CORD INJURY
- 14:25 Martin Schmoll et al (Austria)
ASSESSING ACCURACY OF POWER-PEDALS FOR LOW POWER
OUTPUT IN FES-CYCLING – PRELIMINARY RESULTS
- 14:40-15:10 Coffee Break**

Session 7

Movement Restoration

Chairpersons: Kristin E. Musselman (Toronto, Canada)
Nur Azah Hamzaid (Malaya, Malaysia)

- 15:10 Jonathan Baum et al (France)
TOWARDS ELECTROPHYSIOLOGICAL AND HISTOLOGICAL
MAPPING OF UPPER LIMB NERVES IN PIGS USING EPINEURAL
STIMULATION
- 15:25 Jonathan Jarvis et al (United Kingdom)
INTERFERENTIAL OR MIDDLE-FREQUENCY STIMULATION OF
PERIPHERAL NERVE
- 15:40 Manuela Riegler et al (Austria)
STUDY PROTOCOL: EFFICACY OF EMG-TRIGGERED FOUR-
CHANNEL FUNCTIONAL ELECTRICAL STIMULATION IN ARM-
HAND PARESIS FOLLOWING STROKE
- 15:55 Christine Azevedo et al (France)
EPINEURAL ELECTRICAL STIMULATION FOR GRASP RECOVERY:
28-DAY STUDY IN 4 TETRAPLEGIC PARTICIPANTS
- 16:10 Gabriel Graffagnino et al (France)
REAL-TIME GAIT EVENT DETECTION USING MOTION CAPTURE
TO CONTROL AN ELECTRICAL STIMULATOR: PROOF-OF-
CONCEPT
- 16:25 Christine Singleton et al (United Kingdom)
FES THERAPY IMPROVES GAIT DYNAMICS IN PEOPLE WITH LIMB
LOSS – A FEASIBILITY STUDY
- 16:40-22:40 Bus to
Waldschenke-Staar
Hainbuch 1
3001 Mauerbach

Thursday 18.09.2025

Key

Keynote Lecture

Chairperson: Simona Ferrante (Milano, Italy)

08:30 Ines Bersch-Porada (Nottwil, Switzerland)
"THE SUCCESS OF NOTTWIL" -TAKING A CRITICAL LOOK AT HOW
"SUCCESSFULLY" FES HAS BEEN INTEGRATED INTO
NEUROREHABILITATION

Session 8

Current Challenges and Future Directives of FES 1

Chairpersons: Richard Crevenna (Vienna, Austria)
Ugo Carraro (Padova, Italy)

09:00 Kristin E. Musselman et al (Canada)
DEVELOPMENT OF TOOLKITS AS AN IMPLEMENTATION STRATEGY FOR
FUNCTIONAL ELECTRICAL STIMULATION (FES) IN
NEUROREHABILITATION PRACTICE

09:15 Elina Nezon et al (Canada)
STRATEGIES TO IMPROVE USE, KNOWLEDGE, AND CONFIDENCE OF
FUNCTIONAL ELECTRICAL STIMULATION IN CEREBRAL PALSY
REHABILITATION

Key

Keynote Lecture

Chairperson: Anna Patariaia (Vienna, Austria)

09:30 Barbara Chaloupek (Vienna, Austria)
FROM THE PATIENT'S PERSPECTIVE: VISION FOR THE FUTURE AND
CURRENT OBSTACLES

10:00-10:30 Coffee Break

Key

Keynote Lecture

Chairperson: Manfred Bijak (Vienna, Austria)

10:30

Werner Girsch (Pressbaum, Austria)
40 YEARS PHRENIC NERVE PACING

Key

Keynote Lecture

Chairperson: Erika Spaich (Aalborg, Denmark)

11:00

Manfred Bammer (Vienna, Austria)
REGULATORY HURTTLES FOR INNOVATIVE MEDICAL DEVICES

Session 9

Current Challenges and Future Directives of FES 2

Chairpersons: Christine Singleton (Birmingham, UK)
Hermann Lanmüller (Vienna, Austria)

11:30

Thomas Stieglitz et al (Germany)
FROM INNOVATIVE IDEAS TO CLINICAL TRIALS OPPORTUNITIES AND
OBSTACLES IN TRANSLATIONAL RESEARCH ON NEURAL IMPLANTS

11:45

Christof Ullrich (Austria)
OVERVIEW: PROVIDING FUNCTIONAL ELECTRICAL STIMULATION TO
PEOPLE WITH WALKING DISABILITIES IN AUSTRIA

**Round Table
Discussion**

12:00-13:30

What have we achieved, where are we going, and what do we need for a future that is successful for patients?

Moderator: Jonathan Jarvis (Liverpool, UK)

Panelists:

Ines Bersch-Porada (Switzerland)

Kristin E. Musselman et al (Canada)

Elina Nezon et al (Canada)

Barbara Chaloupek (Austria)

Werner Girsch (Austria)

Manfred Bammer (Austria)

Thomas Stieglitz et al (Germany)

Christof Ullrich (Austria)

Peter van Burk (Netherlands)

Hans Dietl (Austria)

13:30-13:40 **Closing Remarks**



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- intuitive & effective therapy through easy handling & usability

- EMG-triggered multichannel electrical stimulation

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- stimulation of denervated muscles

- help functions directly on the device



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The **Stimulator RISE** represents a breakthrough in the electrotherapy of limp paralysed muscles. This is done with broad biphasic rectangular pulses and, if necessary, very high intensities. It also offers an impulse test to check the progress of training.

New trend: For combining and preparing exoskeleton units and FES sports.

For the treatment of

- Muscle weakness with innervated muscles
- Flaccid paralysis in denervated muscles and muscle degeneration in peripheral pareses
- Treatment of peripheral and central paralysis

Effects of electrostimulation in peripheral paresis

- Maintenance and development of muscle mass and muscle function
- Improved blood circulation
- Better skin condition
- Faster wound healing
- Thicker muscle padding
- Pressure ulcer prevention
- Improved visual appearance and increased self-esteem

Effects of electrostimulation in central paresis

- Muscle building and strength improvement
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- Promotion of neuroplasticity
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- Improvement of gait pattern, mobility and arm function



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Fesia Produkte zum Ausgleich einer Behinderung **verbessern die Lebensqualität** durch funktionelle Elektrostimulation. Die funktionelle Elektrostimulation ermöglicht dabei nicht nur die Funktionen Gehen und Greifen, sondern zeigt auch positive Effekte auf **Muskelkraft, Durchblutung, Reduktion von Schmerz und Spastik, Bewegungsumfang, motorisches Lernen und Neuroplastizität**.

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- Stimulation der Plantarflexion und Dorsalextension, Inversion und Eversion
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- Erkennung der Gangphasen in Echtzeit dank Sensorik
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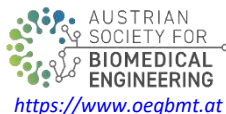


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Artificial Organs

Edited by: Vakhtang Tchatchaleishvili, MD

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