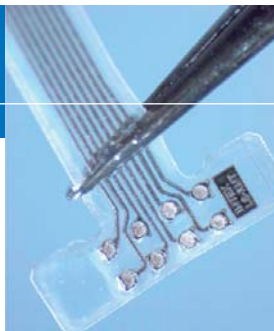


PROGRAMM

IFESS 2008 –
from movement to mind



13th Annual International
FES Society Conference

Freiburg Concert Hall
Freiburg, Germany
September 21st-25th, 2008

On behalf of the organization committee, we would like to cordially welcome you to the 13th Annual Scientific Conference of the International Functional Electrical Stimulation Society (IFESS 2008), held in the "Konzerthaus" Conference Center in Freiburg, Germany.

From Movement to Mind – the applications of electrical stimuli to treat diseases and to restore motor and sensory functions have tremendously grown over the last decades. While 'classical' electrical stimulation mainly addressed the functional rehabilitation of paralyzed limbs, stories of success have been written in the field of cochlea implants, deep brain and vagus nerve stimulation. Recording of bioelectrical signals covers the whole range from diagnosis to rehabilitation. Recently, electrical stimulation was shown to be successful in treating psychiatric disorders, retinal vision prostheses were transferred to human clinical trials and brain-computer-interfaces have provided paralyzed patients a control interface to communicate via a computer screen.

IFESS 2008 presents the state of the art in the allied fields of functional electrical stimulation, neural engineering, neurosciences and neurological disabilities and promotes interdisciplinary discussions between clinicians, physiotherapists, biomedical engineers, and neuroscientists. The conference includes more than 120 contributions on both clinical and technological issues, organized in twelve podium sessions and four poster sessions. In four keynote lectures prominent experts cover a wide range of emerging fields, from fundamental knowledge and understanding in the material-tissue interface to applications in brain-computer-interfaces, the treatment of psychiatric disorders using electrical stimulation, and the ethical and societal implications of doing so.

Furthermore, pre-conference workshops provide researchers and clinicians at different levels of knowledge insights in technological developments and clinical applications. The accompanying exhibition gives an overview of relevant products in the field of electrical stimulation, recording and neural modulation.

We wish to thank our co-researchers from all around the world for choosing to submit their papers to this IFESS conference. Due to their contributions and the critical and constructive reviewing of the members of the technical committee, we managed to assemble a program of high scientific quality.

Besides the exciting technical program, Freiburg offers beautiful surroundings to discuss important developments in your work with colleagues or just to have a break, relax and enjoy the regional wines or beers. We encourage you to take this chance to discover the richness of the old town center with its medieval architecture and little boutiques, the natural beauty of the Black Forest and the hospitality of the people in the German southwest.

We sincerely hope that you will acquire valuable new insights from this year's IFESS conference and find attending it as rewarding as it was preparing it.



Thomas Stieglitz



Martin Schuettler

*Prof. Dr. Thomas Stieglitz
Dr. Martin Schuettler*

Conference Chairs

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P. Taylor, University of Bournemouth, Salisbury District
Hospital, UK

P. Veltink, University of Twente, The Netherlands

J. Weiland, University of Southern California, USA

General Information

Registration Desk

The registration desk will be open

on Sunday, September 21, from 17:00 - 21:00,

on Monday, September 22, from 07:30 - 20:00,

on Tuesday; September 23, from 08:00 - 18:30,

on Wednesday, September 24, from 08:00 - 13:30,

on Thursday, September 25, from 08:00 - 12:45.

You can reach the registration desk via phone at 0049 (0)761 3881 - 494 and via fax at 0049 (0)761 3881 - 495.

You must wear your name tag at all time to identify yourself and gain admission to the sessions.

Technical Support

Projectors and video equipment connected to a local PC will be available in the conference room. Presentations must be saved in Power Point or PDF format. Note that there will be no Macintosh computer or VHS video player on site. Lapel microphones and laser pointers will be available for all speakers. In case of any technical assistance, please contact us at the registration desk prior to your presentation.

Meals

Lunches and Coffee Breaks are included in your registration. If you have any specific restrictions concerning food, please notify us at the registration desk at your arrival or as soon as possible.

Social Events

All Social Events are included in the registration fee. Only for students the Conference Dinner is excluded, tickets can be bought at the registration desk.

Welcome Reception

Sunday, September 21, 19:00 - 22:00 at the Concert Hall

Opening Ceremony and Get Together

Monday, September 22, 19:00 - 22:00 at the Concert Hall

Conference Dinner

Wednesday, September 24, 19:00 - 22:00 at the Historic Merchants Hall

Lab Tours & Excursion

Wednesday, September 24, 13:30 - 18:00 starting from Concert Hall.

The Lab Tours will be to IMTEK and University Hospital.

The Excursion will be a guided tour through Freiburg. The places are limited and only available on a "first come, first serve" basis. Please sign in at the registration desk.

Sunday, September 21, 2008

All Workshops are being held at the IMTEK- Institute, Building 101

W1: Pre-Conference Workshop 1

09:00 - 12:30 **FESAir-Electrical Stimulation in Physiotherapy**

Maura Whittaker (GF Strong Rehab Centre, Canada)

W2: Pre-Conference Workshop 2

09:00 - 12:30 **Microelectrode Array Technologies**

Martin Schuettler (University of Freiburg, Germany)

12:30 - 13:30 **Lunch Break**

W3: Pre-Conference Workshop 3

13:30 - 17:00 **FES for upper limb rehabilitation**

Milos R. Popovic (University of Toronto, Canada)

W4: Pre-Conference Workshop 4

13:30 - 17:00 **Functional Electrical Stimulation and restorative neuroscience**

Jane Burridge (University of Southampton, United Kingdom); Thomas Sinkjaer (Aalborg University, Denmark)

19:00 - 22:00 **Welcome Reception
Concert Hall**

Monday, September 22, 2008

KN1: Keynote Lecture 1

08:15 - 09:00 **Influencing mood by electromagnetic stimulation**

*Malek Bajbouj (Charité Berlin, Germany);
Angela Merkl (Charité Berlin, Germany)*

Mood disorder can severely impair the quality of life and lead to death in up to 15% of patients. In general, mood disorders are well treatable with classical psychopharmacological and psychotherapeutic interventions. However, a considerable number of depressive patients do not respond to or remit during these therapeutical interventions resulting in an increasing interest and need in alternative strategies to treat mood disorders. Among the most promising approaches are brain stimulation techniques, which usually use electromagnetic stimuli to directly or indirectly influence mood relevant brain structures. These neuromodulatory methods comprise older therapies like electroconvulsive therapy and novel approaches like repetitive transcranial magnetic stimulation, magnetic seizure therapy, vagal nerve stimulation, and deep brain stimulation. Although these novel therapeutic techniques hold considerable promise, there still will be need to be further developed before they achieve clinical acceptability.

S1: Oral Session 1

09:00 - 10:30 **Neuromodulation**

Session Chairs: *Malek Bajbouj (Charité Berlin, Germany)
Milos Popovic (University of Toronto, Canada)*

09:00 **Cervical electrical stimulation to the left neck with surface electrodes for treatment of intractable epilepsy**

Atsuko Yoshida (Tohoku University Graduate School of Medicine, Japan); Kazunori Seki (Tohoku University Graduate School of medicine, Japan)

- 09:15 **Vagus nerve activity based prediction of epileptic seizures in rats**
Kristian Rauhe Nielsen (Aalborg University, Denmark); Cristian Sevcencu (Aalborg University, Denmark); Johannes Struijk (Aalborg University, Denmark)
- 09:30 **Filtering Heart Related Activity from Vagus Nerve Recordings in Rats**
Gael de Lannoy (Université catholique de Louvain, Belgium); Jorge Marin (Université Catholique de Louvain, Belgium); Michel Verleysen (Université Catholique de Louvain, Belgium); Jean Delbeke (Université catholique de Louvain, Belgium)
- 09:45 **A hybrid stimulation artifact reduction scheme for micro-fabricated deep brain stimulation and recording probes**
Thi Kim Thoa Nguyen (IMEC, Belgium); Wolfgang Eberle (IMEC, Belgium); Silke Musa (IMEC, Belgium); Jeroen Lammertyn (KULeuven, Belgium); Carmen Bartic (IMEC, Belgium)
- 10:00 **New sacral neurostimulation strategy to enhance micturition in paraplegics**
Faycal Mounaim (Ecole Polytechnique de Montreal, Canada); Ehab Elzayat (McGill University, Canada); Mohamad Sawan (École Polytechnique de Montréal, Canada); Jacques Corcos (McGill University, Canada); Mostafa Elhilali (McGill University, Canada)
- 10:15 **Towards bladder function modeling: FES induced detrusor activity modeling**
Jeremy Laforet (Universite montpellier 2, France); David Guiraud (INRIA, France); Christine Azevedo-Coste (DEMAR Inria/Lirmm, France); David Andreu (University of Montpellier 2, France)

10:30 - 11:00 Coffee Break

S2: Oral Session 2

11:00 - 12:00 FES for Upper Limb I

- Session Chairs:** *Thierry Keller (Institute for Biorobotics, Spain)*
Jane Burridge (University of Southampton, United Kingdom)
- 11:00 **Toronto Rehabilitation Institute Hand Function Test: Unilateral Gross Motor Function Assessment**
Mary Nagai (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Christy Contway (University of Toronto, Canada); Vera Zivanovic (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Kathy Boschen (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Milos Popovic (University of Toronto, Canada)
- 11:15 **Study of Kinematical Synergy of the Arm Joints for FES Control of Reaching Movements in a Plane**
Ali Maleki (Amirkabir University of Technology, Iran); Ali Fallah (Amirkabir University of Technology, Iran)
- 11:30 **Clinical trial of Myoelectrically controlled FES (MeCFES) for as-sisting hand function in subjects with tetraplegia – A study of user population, orthotic effect and ADL use.**
Rune Thorsen (Fondazione Don Gnocchi, IRCCS, Italy); Ettore Beghi (Laboratory of Neurological Disorders, Istituto Mario Negri, Milano, Italy, Italy); Sara Chiaramonte (Spinal Unit, Ospedale Niguarda Ca' Granda, Milano, Italy, Italy); Luca Binda (Spinal Unit, Ospedale Morelli, Sondalo, Italy, Italy); Davide dalla Costa (Spinal Unit, Ospedale Niguarda Ca' Granda, Milano, Italy, Italy); Rosa Maria Converti (FDG, Italy); Eugenio Occhi (Spinal Unit, Ospedale Morelli, Sondalo, Italy, Italy); Tiziana Redaelli (Spinal Unit, Ospedale Niguarda Ca' Granda, Milano, Italy, Italy); Maurizio Ferrarin (Fond. Don Carlo Gnocchi Onlus, Italy)

11:45	<p>Upper Limb Outcomes in Stroke Subjects following Neuroprosthetic Functional Electrical Therapy Vs a Graded Arm Exercise Program <i>Maura Whittaker (GF Strong Rehab Centre, Canada)</i></p>	13:45	<p>Evaluation of control methods for grasp neuroprostheses based on residual movements, myoelectrical activity and cortical signals <i>Ruediger Rupp (Orthopaedic University Hospital, Germany); Gernot Müller-Putz (Graz University of Technology, Austria); Gert Pfurtscheller (Graz University of Technology, BCI-Lab, Austria); Hans Jürgen Gerner (Stiftung Orthopädische Universitätsklinik Heidelberg, Germany); Gerhard Vossius (University of Karlsruhe, Germany)</i></p>
12:00	<p>Clinical effectiveness and participant perceptions of an implanted closed-loop neurostimulator-sensor system for arm rehabilitation post-stroke <i>Ruth Turk (University of Southampton, United Kingdom); Jane BurrIDGE (University of Southampton, United Kingdom); Daniel Merrill (Alfred E. Mann Foundation, USA); Gregoire Cosendai (Alfred E. Mann Foundation, Switzerland); Anne-Marie Hughes (University of Southampton, United Kingdom); Joe Schulman (Alfred E. Mann Foundation, USA)</i></p>	14:00	<p>A Feasibility Study to assess the effect of Accelerometer Triggered Electrical Stimulation on Recovery of Upper Limb function in Chronic Stroke Patients <i>Geraldine Mann (Dept. Clinical Science and Engineering, United Kingdom); Paul Taylor (University of Bournemouth, Salisbury District Hospital, United Kingdom); Rod Lane (National Clinical FES Centre, United Kingdom)</i></p>
12:15	<p>Feasibility study of an implanted FES device for hand opening following stroke <i>Julie Esnouf (National Clinical FES Centre, United Kingdom); Geraldine Mann (Dept. Clinical Science and Engineering, United Kingdom); Rod Lane (National Clinical FES Centre, United Kingdom); Thanh Dao (Finetech Mewdical Limited, United Kingdom)</i></p>	14:15	<p>Application of local EMG-Driven Electrical Stimulation to paretic shoulder muscle of the proximal dominant hemiplegics <i>Kazunori Seki (Tohoku University Graduate School of medicine, Japan)</i></p>
12:30 - 13:30 Lunch Break		14:30	<p>Optimized electrode placement and improved EMG detection for a new textile grasping neuroprosthesis <i>Marc Lawrence (ETH Zurich, Switzerland); Samuel Monteleone (ETH Zurich, Switzerland); Thierry Keller (Institute for Biorobotics, Spain); Silvestro Micera (Institute for Biorobotics, Italy)</i></p>
S3: Oral Session 3			
13:30 - 14:45 FES for Upper Limb II			
<p>Session Chairs: <i>Ruediger Rupp (Orthopaedic University Hospital, Germany) Paul Taylor (University of Bournemouth, Salisbury District Hospital, United Kingdom)</i></p>			
13:30	<p>Assessment of a User Command Controller for People with High Level Tetraplegia to Control a Full Upper Limb Neuroprosthesis In Five Degrees of Freedom <i>Timothy Scott (Royal North Shore Hospital, Australia); Veronica Vare (Royal North Shore Hospital, Australia)</i></p>		

	P1: Poster Session 1
14:45 - 15:45	FES for Upper and Lower Limb, Bladder Control"

Coffee

- P1.1** **Sacral surface electrical stimulation can control the contraction of prostatic smooth muscle**
Chie Hirayama (University of Tohoku, Japan)
- P1.2** **Therapeutic effect of MeCFES Assisted Finger Extension on the Hand of Hemiparetic Subjects**
Rune Thorsen (Fondazione Don Gnocchi, IRCCS, Italy); Marco Cortesi (Rehabilitation Unit, Milano - Fond. Don Carlo Gnocchi Onlus., Italy); Johanna Jonsdottir (Rehabilitation Unit, Milano - Fond. Don Carlo Gnocchi Onlus, Italy, Italy); Manuela Diverio (Rehabilitation Unit, Sarzana - Fond. Don Carlo Gnocchi Onlus, Italy); Rosa Maria Converti (FDG, Italy); Ilaria Carpinella (Biomedical Technology Department - Fond. Don Carlo Gnocchi Onlus, Italy); Anna Casiraghi (FDG, Italy); Martina Puglia (Rehabilitation Unit, Sarzana - Fond. Don Carlo Gnocchi Onlus., Italy); Maura Casadio (University of Genoa, Italy); Paolo Mazzoleni (Biomedical Technology Department - Fond. Don Carlo Gnocchi Onlus, Italy); Daniela Morelli (Rehabilitation Unit, Milano - Fond. Don Carlo Gnocchi Onlus, Italy); Maurizio Ferrarin (Fond. Don Carlo Gnocchi Onlus, Italy)
- P1.3** **From mind to movement – Contralateral EMG-triggered Electrical Stimulation for Bilateral Movements in Hemiparetic Patients**
Carmen Krewer (Neurologische Klinik Bad Aibling, Germany); Christopher Sikorski (Neurologische Klinik Bad Aibling, Germany); Christian Blechs Schmidt (Neurologische Klinik Bad Aibling, Germany); Friedemann Müller (Neurologische Klinik Bad Aibling, Germany); Jochen Quintern (Neurologische Klinik Bad Aibling, Germany)

- P1.4** **Preliminary Evaluation for a Functional Support of the Elbow and Shoulder Joint**
Christian Pylatiuk (Forschungszentrum Karlsruhe, Germany)
- P1.5** **An Evaluation of Hemiplegic Upper Extremity Coordination by A Robotic Support System to Reconstruct The Reaching Movement Using Functional Electrical Stimulation**
Satoaki Chida (Akita University Hospital, Japan)
- P1.6** **Continuous-Time Control of Spring Brake Orthotic Swing Phase**
M Saiful Huq (University of Sheffield, United Kingdom); Babul Salam Kader Ibrahim (University of Sheffield, United Kingdom); M. Tokhi (University of Sheffield, United Kingdom)
- P1.7** **Muscle Activation Response to Electrical Stimulation for Motor Complete SCI following a Stand Retraining and Functional Electrical Stimulation Intervention: A Case Study.**
Gail Forrest (KMRREC, USA); Poursan Faghri (University of Connecticut and Community Medicine (School of Medicine, USA); Mathew Yarossi (KMRREC, USA); Steven Kirshblum (Kessler Institute for Rehabilitation, USA); Erica Garbarini (KMRREC, USA); Sue Ann Sisto (KMRREC, USA); Susan Harkema (University of Louisville, USA)
- P1.8** **Clinical long-term follow up of FES for correction of foot drop: a case report**
Takenori Tomite (Akita University, Japan)
- P1.9** **Measurement of relative joint angle and acceleration of the lower limb during walking**
Noreha Abdul Malik (University of Southampton, United Kingdom); Paul Chappell (University of Southampton, United Kingdom); Duncan Wood (Salisbury District Hospital, United Kingdom); Paul Taylor (University of Bournemouth, Salisbury District Hospital, United Kingdom)

P1.10	Evaluation of electrical stimulation of gait and posture in elderly people <i>Kazutoshi Hatakeyama (Akita University, Japan)</i>	16:15	Modulation of stimulation frequency of afferents of the spinal cord from the same site and intensity can induce a variety of movements <i>Winfried Mayr (Medical University of Vienna, Austria); Christian Hofer (Ludwig Boltzmann Institute of Electrical Stimulation and Physical Rehabilitation, Austria); Karen Minassian (Vienna University of Technology, Austria); Ursula Hofstoetter (Vienna University of Technology, Austria); Helmut Kern (Wilhelminenspital Wien, Austria); Manfred Bijak (Medical University of Vienna, Austria); Ewald Unger (Medical University of Vienna, Austria); Frank Rattay (Vienna University of Technology, Austria); Milan Dimitrijevic (Baylor College of Medicine, USA)</i>
P1.11	Detection of Gait Phases with Piezoelectric Gyroscope under Different Walking Speed Conditions <i>Norio Furuse (Miyagi National College of Technology, Japan)</i>		
P1.12	Gait Event Detection using Tilt Sensor for Portable FES System <i>RyangHee Sohn (Yonsei University, Korea)</i>		
	S4: Oral Session 4		
15:45 - 17:00	FES for Lower Limb"		
	Session Chairs: <i>Andy Hoffer (Simon Fraser University, Canada)</i> <i>Manfred Bijak (Medical University of Vienna, Austria)</i>	16:30	Effect of neuro-muscular electrical stimulation on tibialis anterior in children with cerebral palsy. <i>Carla De Conti ("E.Medea" research institute, Conegliano, Italy); Enrico Trevisi (E. Medea Scientific Center, Conegliano Research Institute, Italy); Annamaria Salghetti (E. Medea Scientific Institute, Conegliano Research Center, Italy)</i>
15:45	The Control Strategy of FES Using Accelerometers in Standing Balance Training <i>Shih Wei Chen (National Taiwan University, Taiwan); Shih Ching Chen (Taipei Medical University and Hospital, Taiwan); Chiun Fan Chen (National Taiwan University, Taiwan); Jin-Shin Lai (Nation Taiwan Univeristy, Taiwan); Te Son Kuo (National Taiwan University, Taiwan)</i>	16:45	Estimation of Nerve Dimensions from MRI of the Human Thigh <i>Andy Hoffer (Simon Fraser University, Canada); Faisal Beg (Simon Fraser University, Canada); Eli Gibson (Simon Fraser University, Canada); Burkhard Madler (University of British Columbia, Canada)</i>
16:00	The Interaction of Paired Associative Stimulation and repetitive Electrical Stimulation <i>Natalie Mrachacz-Kersting (Aalborg University, Denmark); Thomas Sinkjær (Aalborg University, Denmark)</i>		

P2: Poster Session 2

17:00 - 18:00 Neuromodulation, Modelling & Control^{II}

Coffee

- P2.1 Epidural stimulation of the motor cortex for neuropathic pain: future directions**
Thomas Reithmeier (University of Freiburg, Germany); Marcus Pinsker (University of Freiburg, Germany); Tobias Piroth (University of Freiburg, Germany); Michael Trippel (University of Freiburg, Germany); Thomas Prokop (University of Freiburg, Germany); Guido Nikkhah (University of Freiburg, Germany)
- P2.2 Application of Pulsed Radio Frequency to the dorsal horn and dorsal roots**
Omar Omar-Pasha (Maria-Stern-Hospital, Germany)
- P2.3 Striatal microstimulation in awake animals depends on NMDA receptor activity**
Susanne Loeffler (University of Luebeck, Germany); Simon Vogt (University of Luebeck, Germany); Ulrich Hofmann (University of Luebeck, Germany); Andreas Moser (University of Luebeck, Germany)
- P2.4 Electrical hippocampus stimulation for treatment of epilepsy**
Andreas Schulze-Bonhage (University Hospital Freiburg, Germany); Michael Trippel (University of Freiburg, Germany); Joacir Cordeiro (University Hospital Freiburg, Germany); Dirk-Matthias Altenmueller (University Hospital Freiburg, Germany); Kathrin Wagner (University Hospital Freiburg, Germany); Guido Nikkhah (University of Freiburg, Germany)

- P2.5 Evaluation of low frequency stimulation in fully kindled rats**
Joacir Cordeiro (University Hospital Freiburg, Germany); Karina Kohn Cordeiro (University Hospital Freiburg, Germany); Alberto Capurro (University Hospital Freiburg, Germany); Ad Aertsen (Universität Freiburg, Germany); Andreas Schulze-Bonhage (University Hospital Freiburg, Germany)
- P2.6 Optimally spaced stimulation for clinical use with FES – its effect on spinal reflexes & muscle activation**
Darren Hart (University of Southampton, United Kingdom); Duncan Wood (Salisbury District Hospital, United Kingdom); Paul Taylor (University of Bournemouth, Salisbury District Hospital, United Kingdom); Paul Chappell (University of Southampton, United Kingdom)
- P2.7 Bilateral Teleoperator System of Robot with Force Reflection using Functional Electrical Stimulation**
Takehiro Iwami (Akita University, Japan)
- P2.8 On the Use of Adaptive Control in Stimulation-Assisted Neuromotor Therapy**
James Abbas (Arizona State University, USA)
- P2.9 Adaptive Neuro-Sliding Mode Control of FES-Cycling**
Khashayar Misaghian (Iran University of Science and Technology, Iran); Abbas Erfanian (Iran University of Science and Technology, Iran)
- P2.10 FES Adaptive Feedback Control using Neural networks with PID**
Raymond Kai-yu Tong (The Hong Kong Polytechnic University, Hong Kong)

- P2.11** **Elliptical FES Stepping: Effect of Varying Stimulation Angles**
Nur Azah Hamzaid (The University of Sydney, Australia); Che Fornusek (The University of Sydney, Australia); Richard Smith (The University of Sydney, Australia); Glen Davis (The University of Sydney, Australia)
- P2.12** **A New FES-Based Fuzzy Logic Control Strategy Aiming to Support Standing in Paraplegia**
Ciprian Stefan (Technical University "Gh. Asachi" of Iasi, Romania); Marian Poboroniuc (Technical University "Gh. Asachi" of Iasi, Faculty of Electrical Engineering, Romania); Gheorghe Livint (Technical University "Gh. Asachi" of Iasi, Faculty of Electrical Engineering, Romania); Danut Irimia (Technical University "Gh. Asachi" of Iasi, Faculty of Electrical Engineering, Romania)
- P2.13** **Adaptive Neuro-Sliding Mode Control of Ankle Movement Using Electrical Stimulation of Agonist-Antagonist Muscles**
Hamid Reza Kobravi (Iran University of Science and Technology, Iran); Abbas Erfanian (Iran University of Science and Technology, Iran)
- P2.14** **A simple biomechanical model of the trunk for FES assisted balance control in paraplegia**
Michele Vanoncini (University of Reading, United Kingdom); William Holderbaum (School of System Engineering, United Kingdom); Brian Andrews (Oxford Brookes University, United Kingdom)
- P2.15** **A Preliminary Test of Modified Applying Methods of Feedback Error Learning for FES Control**
Takashi Watanabe (Tohoku University, Japan)

- P2.16** **Control Strategies Adopted by Elite FES Rowers**
Sina Sareh (Oxford Brookes University, United Kingdom); Brian Andrews (Oxford Brookes University, United Kingdom); Matthew Green (Oxford Brookes University, United Kingdom); Adrian Poulton (ICT Department, United Kingdom)
- P2.17** **Emulobody: a mechatronic device to test FES-based standing control strategies in paraplegia**
Marian Poboroniuc (Technical University "Gh. Asachi" of Iasi, Faculty of Electrical Engineering, Romania); Ciprian Stefan (Technical University "Gh. Asachi" of Iasi, Romania)

18:00 - 19:00 Meeting of the Upper Limb Assessment Group
Co-Chaired by Roger Nathan and Catherine Lang

19:00 - 20:00 Opening Ceremony Honorary Lecture
G. Vossius (University of Karlsruhe, Germany)

20:00 - 22:00 Get Together Industrial Exhibition

Tuesday, September 23, 2008

KN2: Keynote Lecture 2

08:15 - 09:00 Inference of hand movements from population activity in monkey and human sensorimotor cortex: Towards Brain-Machine Interfaces "

Ad Aertsen (University of Freiburg, Germany)

In monkeys, activity of multiple single neurons related to arm movement can be employed to control an external actuator. Based on this work, there is an increasing interest in designing implantable brain-machine interfaces (BMI), enabling real-time control of neuroprosthetic devices. Such movement inference has recently been demonstrated in humans, but little is yet known about the possibility to decode information for the control of reaching and grasping from different sensorimotor areas activated by hand movements. Evidently, specificity and long-term stability of the recorded signals is essential for successful brain-machine interface applications. Thus, a promising novel approach for robust neuro-interfacing is based on neuronal population activity, instead of multiple single neuron activity. Earlier, we demonstrated that local field potentials from monkey primary motor cortex can be as efficient as single neuron activity for decoding arm movements 1,2. I will give an overview of these results and present more recent findings 3-7, aimed at studying the feasibility of inferring hand movements in humans from single-trial population activity measured with electrodes on the cortical surface or even from the scalp.

S5: Oral Session 5

09:00 - 10:45 Brain Computer Interfaces + Invited Talk by J.R. Wolpaw"

*Session Chairs: Jonathan Wolpaw (Wadsworth Center, USA)
Ad Aertsen (Universität Freiburg, Germany)*

09:00 Brain-Computer Interface (BCI) Research and Development at the Wadsworth Center

Jonathan Wolpaw (Wadsworth Center, USA)

09:30 Development of a neuronal motor prosthesis for the restoration of movement in paralyzed people

Jörn Rickert (Uni Freiburg, Germany)

09:45 Performance and control error related neuronal signals in human ECoG recordings

Tomislav Milekovic (University of Freiburg, Germany)

10:00 Discriminating sounds from the human electrocorticogram for braincomputer

Chloé Huetz (University Freiburg, Germany)

10:15 Development and Testing of Non-Invasive BCI + FES/Robot System For Use in Motor Re-Learning After Stroke

Janis Daly (Case Western Reserve University School of Medicine, USA); Roger Cheng (Department of Veterans Affairs, USA); Kenneth Hrovat (Department of Veterans Affairs, USA); Krisanne Litinas (Department of Veterans Affairs, USA); Jean Rogers (Department of Veterans Affairs, USA); Mark Dohring (Department of Veterans Affairs, USA)

10:30 Real time decoding of hand grasping signals from macaque pre-motor and parietal cortex

Benjamin Townsend (Uni | ETH Zurich, Switzerland); Erk Subasi (Institute of Neuroinformatics, Switzerland); Hansjörg Scherberger (Uni | ETH Zurich, Switzerland)

10:45 - 11:15 Coffee Break

S6: Oral Session 6**11:15 - 12:45 Vision & Auditory Neuroprostheses**

Session Chairs: Gregg Suaning (University of New South Wales, Australia)
Phil Troyk (Illinois Institute of Technology USA)

11:15 **Physiologically inspired coding strategies for cochlear implants**

Andreas Bahmer (University of Frankfurt, Germany); Uwe Baumann (University of Frankfurt, Germany); Gerald Langner (Technical University Darmstadt, Germany)

11:30 **Determining the Feasibility of an Intracortical Visual Prosthesis**

Phil Troyk (Illinois Institute of Technology, USA)

11:45 **Functional Stimulation in Visual Neuroprostheses**

Samuel Romero (University of Jaen, Spain); Christian Morillas (University of Granada, Spain); Francisco Pelayo (University of Granada, Spain); Eduardo Fernández (University Miguel Hernández, Spain)

12:00 **Visual Sensations Mediated By Subretinal Microelectrode Arrays Implanted Into Blind Retinitis Pigmentosa Patients**

Eberhart Zrenner (University of Tübingen, Germany)

12:15 **Performance of a next generation active subretinal chip**

Alex Harscher (Retina Implant, Germany); Steffen Kibbel (Retina Implant AG, Germany)

12:30 **Hermetic Encapsulation of an Implantable Vision Prosthesis – Combining Implant Fabrication Philosophies**

Anne Vanhoestenberghé (University College London, United Kingdom); Nick Donaldson (University College London, United Kingdom); Nigel Lovell (UNSW, Australia); Gregg Suaning (University of New South Wales, Australia)

12:45 - 13:45 Lunch Break**S7: Oral Session 7****13:45 - 15:15 Neural Interfaces**

Session Chairs: Patrick Ruther (University of Freiburg, Germany)
Nick Donaldson (University College London, United Kingdom)

13:45 **Electrochemical characterisation of laser-opened electrode contacts of implantable neuroprostheses**

Christian Henle (Universität Freiburg, Germany); Martin Schuettler (University of Freiburg, Germany); Mark Keller (Universität Freiburg, Germany); Thomas Stieglitz (University of Freiburg, Germany)

14:00 **A Flexible 29 Channel Epicortical Electrode Array**

Martin Schuettler (University of Freiburg, Germany); Juan Ordonoez (University of Freiburg, Germany); Christian Henle (Universität Freiburg, Germany); Dongin Oh (University College London, United Kingdom); Ori Gilad (University College London, United Kingdom); David Holder (University College London, United Kingdom)

14:15 **Towards high aspect ratio tungsten Micro Electrode Array for neural recording and stimulation applications**

Prashant Tathireddy (University of Utah, USA); Selim Kruppenacker (Fraunhofer IBMT, Germany); Sascha Kammer (Fraunhofer-Institut für Biomedizinische Technik IBMT, Germany); Klaus Hoffmann (Fraunhofer Institut für Biomedizinische Technik, Germany); Florian Solzbacher (University of Utah, USA)

14:30	<p>The NeuroProbes Project – Multifunctional Probe Arrays for Neural Recording and Stimulation <i>Patrick Ruther (University of Freiburg, Germany); Arno Aarts (Interuniversity Microelectronics Centre (IMEC), Belgium); Olivier Frey (Institute of Microtechnology (IMT), University of Neuchâtel, Switzerland); Stanislav Herwik (University of Freiburg, Germany); Sebastian Kisban (University of Freiburg, Germany); Karsten Seidl (University of Freiburg, Germany); Sven Spieth (Hahn-Schickard-Gesellschaft, Germany); Axel Schumacher (HSG-IMIT, Germany); Milena Koudelka-Hep (University of Neuchatel, Switzerland); Oliver Paul (IMTEK, Germany); Thomas Stieglitz (University of Freiburg, Germany); Roland Zengerle (IMTEK Freiburg, Germany); Hercules Neves (Interuniversity Microelectronics Centre (IMEC), Belgium)</i></p>	<p>P3: Poster Session 3 15:15 - 16:15 FES for Exercise, Denervated Muscles & Stroke Coffee</p>
14:45	<p>A new integrated optical and electrophysiological sensor <i>David Krapohl (University of Applied Sciences Aachen, Germany); Ulrich Hofmann (University of Luebeck, Germany); Kunal Mankodiya (University of Luebeck, Germany)</i></p>	<p>P3.1 Gain-Scheduled EMG-Controlled Electrical Stimulation <i>Raafat Shalaby (Technische Universität Berlin, Germany); Thomas Schauer (Technische Universität Berlin, Germany); Holger Nahrstaedt (Technische Universität Berlin, Germany)</i></p> <p>P3.2 Effect of intensive functional electrical stimulation therapy on the upper limb motor recovery after stroke <i>Noritaka Kawashima (University of Toronto, Canada); Milos Popovic (University of Toronto, Canada)</i></p> <p>P3.3 Application of accelerometer and gyroscope in FES assisted walking for the correction of drop foot <i>Toshiki Matsunaga (Akita University Hospital, Japan)</i></p>
15:00	<p>Development of the first actuated intraneural electrode <i>Bossi (Scuola Superiore Sant'Anna, Pisa, Italy); Sascha Kammer (Fraunhofer-Institut für Biomedizinische Technik IBMT, Germany); Thomas Doerge (IBMT, Germany); Arianna Menciassi (Scuola Superiore Sant'Anna, Italy); Klaus-Peter Hoffmann (IBMT, Germany); Silvestro Micera (Institute for Biorobotics, Italy)</i></p>	<p>P3.4 Integration between fMRI and motion capture system to evaluate changes in cortical activations after rehabilitation in hemiplegic patients <i>Nicola Volonterio (Politecnico di Milano, Italy); Simona Ferrante (Politecnico di Milano, Italy); Claudia Casellato (Politecnico di Milano, Italy); Alessandra Pedrocchi (Politecnico di Milano, Italy); Franco Molteni (Valduce Hospital, Villa Beretta Rehabilitation Center, Italy); Giancarlo Ferrigno (Politecnico di Milano, Italy); Giuseppe Baselli (Politecnico di Milano, Italy); Alberto Martegani (Valduce Hospital, Italy); Tiziano Frattini (Valduce Hospital, Italy)</i></p> <p>P3.5 Muscle and Bone changes in Denervated and Degenerated Muscles Treated with Electrical Stimulation <i>Thordur Helgason (Landspítali - University Hospital, Iceland)</i></p>

		S8: Oral Session 8	
		16:15 - 17:45 Neural Recording & Stimulation"	
P3.6	<p>Energy-Efficient FES Cycling with Quadriceps Stimulation <i>Babul Salam Kader Ibrahim (University of Sheffield, United Kingdom); Samad Gharooni (University of Sheffield, United Kingdom); M. Tokhi (University of Sheffield, United Kingdom); Rasha Massoud (University of Sheffield, United Kingdom)</i></p>		<p>Session Chairs: <i>Klaus Peter Koch (University of Applied Science Darmstadt, Germany)</i> <i>Maurits Ortmanns (University of Ulm, Germany)</i></p>
P3.7	<p>Trainings- and Measurement- System for FES- Cycling <i>Werner Reichenfelser (Vienna University of Technology, Austria); Harald Hackl (Technical University Vienna, Austria); Stefan Mina (ARC GmbH, Austria); Sten Hanke (ARC GmbH, Austria); Peter Lugner (Technical University Vienna, Austria); Margit Gföhler (Technical University Vienna, Austria)</i></p>	16:15	<p>Selective Activation of Pig Forearm Muscles using Thin-Film Intrafascicular Electrodes Implanted in the Median Nerve <i>Mathijs Kurstjens (Aalborg University, Denmark); Winnie Jensen (Aalborg University, Denmark); Ken Yoshida (Indiana University – Purdue University Indianapolis, USA)</i></p>
P3.8	<p>Electrical muscle stimulation can be used to elicit incremental cardiovascular exercise response and subjective effort without undue discomfort in adult subjects. <i>Domenico Crognale (University college Dublin, Ireland); Jean Francois Grosset (University College Dublin, Ireland); Louis Crowe (University College Dublin, Ireland); Conor Minogue (Bio-medical Research (BMR) Ltd., Ireland); Giuseppe DeVito (University College Dublin, Ireland); Brian Caulfield (University College Dublin, Ireland)</i></p>	16:30	<p>Multi-scale and higher order statistical analyses of intrafascicular nerve recordings <i>Mastaneh Torkamani Azar (Indiana University Purdue University Indianapolis, USA); Ernest Kamavuako (Aalborg University, Denmark); Paul Salama (Indiana University Purdue University Indianapolis, USA); Ken Yoshida (Indiana University – Purdue University Indianapolis, USA)</i></p>
P3.9	<p>The Metabolic Efficiency of FES cycling <i>Lynsey Duffell (Kings College London, United Kingdom); Nick Donaldson (University College London, United Kingdom); Di Newham (Kings College London, United Kingdom)</i></p>	16:45	<p>Classification of afferent signals from single channel cuff neural electrodes <i>Stanisa Raspopovic (Scuola Superiore Sant Anna, Italy)</i></p>
P3.10	<p>Stimulation of shank muscles during FES cycling to maximize ankle movement <i>Che Fornusek (The University of Sydney, Australia); Nur Azah Hamzaid (The University of Sydney, Australia)</i></p>	17:00	<p>A Reconfigurable and Automated System for the Study of Stimulus Waveform Parameters <i>Virginia Woods (Imperial College London, United Kingdom); Iasonas Triantis (Imperial College London, United Kingdom); Christofer Toumazou (Imperial College London, United Kingdom)</i></p>

17:15 **In vitro evaluation of a high-frequency current-switching stimulation technique for FES applications**
Xiao Liu (University College London, United Kingdom); Andreas Demosthenous (University College London, United Kingdom); Anne Vanhoostenberghe (University College London, United Kingdom); Nick Donaldson (University College London, United Kingdom)

17:30 **iSANLA: intelligent Sensor and Actuator Network for Life Science Applications**
Michael Schiek (Forschungszentrum Jülich, Germany); Mario Schlösser (Forschungszentrum Jülich, Germany); Andreas Schnitzer (Forschungszentrum Jülich, Germany); Carmen Silex (Forschungszentrum Jülich GmbH, Germany); Hong Ying (Forschungszentrum Jülich, Germany)

P4: Poster Session 4

17:45 - 18:45 Brain Computer Interfaces & Neural Technology"

Coffee

P4.1 Wavelet-Based Spike Sorting of Muscle Spindle Afferent Nerve Activity Recorded With Thin-Film Intrafascicular Electrodes
Milan Djilas (INRIA, France); Christine Azevedo-Coste (DEMAR Inria/Lirmm, France); David Guiraud (INRIA, France); Jerome Bourien (University of Montpellier1 - Inserm U583, France); Ken Yoshida (Indiana University - Purdue University Indianapolis, USA)

P4.2 Tactile Discrimination Based on Intracortical Microstimulation in Primary Somatosensory Cortex in Sprague-Dawley Rats
Winnie Jensen (Aalborg University, Denmark); Patrick Rousche (University of Illinois at Chicago, USA)

P4.3 Electrooculography-based Human Interface for Robot Controlling
Eduardo Iáñez (University Miguel Hernández, Spain); Jose Azorin (Universidad Miguel Hernandez de Elche, Spain); Eduardo Fernández (University Miguel Hernández, Spain); Ricardo Morales (University Miguel Hernández, Spain)

P4.4 EEG-based brain computer linterface (BCI) controlled functional electrical stimulation (FES) therapy for stroke rehabilitation
Raymond Kai-yu Tong (The Hong Kong Polytechnic University, Hong Kong)

P4.5 ECoG Controlled Neuroprosthesis for Grasping: Preliminary Study
Cesar Márquez-Chin (Rehabilitation Engineering Laboratory, University of Toronto, Canada); Tracy Cameron (Toronto Western Hospital Research Institute, Canada); Andres Lozano (Toronto Western Hospital Research Institute, Canada); Robert Chen (Toronto Western Hospital Research Institute, Canada); Milos Popovic (University of Toronto, Canada)

P4.6 An Interactive Virtual Reality based BCI for On-line Control of Hand Grasping, Opening, and Holding: Feature Selection by Mutual Information
Abbas Erfanian (Iran University of Science and Technology, Iran); Navid Hamedi (Iran University of Science and Technology, Iran)

P4.7 A step towards discretized motion control of the upper limb using EEG-based brain-computer interface and electrical stimulation
Adrian Tan (Nanyang Technological University, Singapore); Dingguo Zhang (Lirmm, France)

- P4.8 Optimization of microporous platinum coatings for neural micro-electrodes**
Wigand Poppendieck (Fraunhofer Institute for Biomedical Engineering, Germany); Thomas Dörge (Fraunhofer Institute for Biomedical Engineering, Germany); Klaus Hoffmann (Fraunhofer Institut für Biomedizinische Technik, Germany)
- P4.9 Five valuable functions of blocking capacitors in stimulators**
Xiao Liu (University College London, United Kingdom); Andreas Demosthenous (University College London, United Kingdom); Nick Donaldson (University College London, United Kingdom)
- P4.10 An Experimental Study on Passive Charge Balancing**
Kriangkrai Sooksood (University of Ulm, Germany); Thomas Stieglitz (University of Freiburg, Germany); Maurits Ortmanns (University of Ulm, Germany)
- P4.11 Challenges facing packaging of small scale biomedical implants**
Nooshin Saeidi (University College London, United Kingdom); Andreas Demosthenous (University College London, United Kingdom); Nick Donaldson (University College London, United Kingdom); John Alderman (Tyndall National Institute, Ireland)
- P4.12 The 3D potential induced by functional electrical stimulation with multi-contact cuff electrodes: simulation and validation.**
Maureen Clerc (Ecole Nationale des Ponts et Chaussées, France); Romain Veltz (INRIA and MXM, France); David Guiraud (INRIA, France); Jean-Louis Divoux (MXM company, France)

- P4.13 A New Intramuscular Electrode for Functional Electrical Stimulation in the Rat**
Mary Nagai (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Abdulkadir Bulsen (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Abdolazim Rashidi (Toronto Rehabilitation Hospital Lyndhurst Site, Canada); Marina Erenshteyn (A.I duPont Hospital for Children, USA); Milos Popovic (University of Toronto, Canada)
- P4.14 First human intra-operative testing of the Stimulus Router System**
Arthur Prochazka (University of Alberta, Canada); Liu Shi Gan (University of Alberta, Canada); Jaret Olson (University of Alberta, Canada); Michael Morhart (University of Alberta, Canada)

19:00 IFESS Board of Directors Meeting

Wednesday, September 24, 2008

KN3: Keynote Lecture 3

08:15 - 08:45 Ethical and Societal Implications of Central Nervous System Neuro-prostheses

Steffen Rosahl (HELIOS Kliniken GmbH, Germany)

The ethical principles for research, development and clinical application of neural prosthesis and neural implants should not differ from those for other medical devices or pharmaceutical agents as long as the prosthesis restores lost function or modulates disturb function in the central nervous system. In other words, as long as treatment is concerned, careful risk - side effects - benefit assessment and informed consent of the patient will safely guide our endeavours. Availability of neural prosthesis, i.e. the ability and willingness of health insurance providers to support implants will probably become more important with increasing clinical indications. "Enhancement", i.e. the extension of human capabilities beyond the normal range with neural implants does not play a role in today's applications but its potential and often reiterated public fears require an informed public debate that will bring issues of social importance like personal identity and the self-understanding of human beings to the foreground.

S9: Oral Session 9

09:00 - 10:45 FES for Exercise

Session Chairs: *Glen Davis (The University of Sydney, Australia)*
Brian Andrews (Oxford Brookes University, United Kingdom)

09:00 FESAiR: Integration of Functional Electrical Stimulation with Physiotherapy Clinical Practice: 2008 Report

Maura Whittaker (GF Strong Rehab Centre, Canada)

09:15

The Effects of Subcutaneous Fat, Electrode Size and Inter-Electrode Distance During Transcutaneous Electrical Stimulation

Emer Doheny (University College Dublin, Ireland); Brian Caulfield (University College Dublin, Ireland); Conor Minogue (Bio-medical Research (BMR) Ltd., Ireland); Madeleine Lowery (University College Dublin, Ireland)

09:30

Electrical muscle stimulation can be used to elicit cardiovascular exercise response at training intensities in obese adults

Jean Francois Grosset (University College Dublin, Ireland); Donal O'Shea (St Vincent's University Hospital, Ireland); Louis Crowe (University College Dublin, Ireland); Conor Minogue (Bio-medical Research (BMR) Ltd., Ireland); Brian Caulfield (University College Dublin, Ireland)

09:45

FES-supported interval training following sensorimotor-complete spinal cord injury: a case series.

Jack Crosbie (University of Sydney, Australia); Michael Russold (Otto Bock Healthcare Products GmbH, Austria); Jacqui Raymond (University of Sydney, Australia); James Middleton (University of Sydney, Australia); Glen Davis (The University of Sydney, Australia)

10:00

Cardiovascular Effects of FES and Passive Stepping on Orthostatic Hypotension

Lorne Chi (University of Toronto, Canada); Kei Masani (University of Toronto, Canada); Masae Miyatani (University of Toronto, Canada); T. Adam Thrasher (University of Houston, USA); K. Wayne Johnston (University of Toronto, Canada); Alexandra Mardimae (University of Toronto, Canada); Joseph Fisher (University of Toronto, Canada); Milos Popovic (University of Toronto, Canada); Cathie Kessler (Thornhill Research Inc, Canada)

10:15 **Changes in superficial pressure and tissue oxygenation levels due to contractions elicited by intermittent electrical stimulation for the prevention of deep tissue injury**

Leandro Solis (University of Alberta, Canada)

10:30 **The effect of different types of chronic electrical stimulation training on muscle contractile and histological properties: A pilot study.**

Lynsey Duffell (Kings College London, United Kingdom); Anthea Rowleron (Kings College London, United Kingdom); Nick Donaldson (University College London, United Kingdom); Di Newham (Kings College London, United Kingdom)

10:45 - 11:15 Coffee Break

S10: Oral Session 10

11:15 - 12:45 FES Cycling

Session Chairs: *Rik Berkelmanns (Nijmegen, The Netherlands); Simona Ferrante (Politecnico di Milano, Italy)*

11:15 **First experiences in Hometraining with FES cycling**

Derek Jones (Anatomical Concepts (UK) Ltd, United Kingdom); Andrea Weber (Employee, Germany)

11:30 **The use of functional electrical stimulation assisted cycling in adolescents with cerebral palsy**

Ann Tokay (University of Delaware, USA); Calum McRae (Shriners Hospitals for Children, Philadelphia, USA); Therese Johnston (Shriners Hospitals for Children, Philadelphia, USA); Samuel Lee (Shriners Hospital for Children, USA)

11:45 **Design of a symmetry controller for FES cycling - Preliminary results on post-acute stroke patients**

Emilia Ambrosini (Politecnico di Milano, Italy); Simona Ferrante (Politecnico di Milano, Italy); Thomas Schauer (Technische Universität Berlin, Germany); Alessandra Pedrocchi (Politecnico di Milano, Italy); Giancarlo Ferrigno (Politecnico di Milano, Italy); Franco Molteni (Valduce Hospital, Villa Beretta Rehabilitation Center, Italy)

12:00 **Work Efficiency and Stimulation Cost during FES-cycling by Children with a Spinal Cord Injury**

Calum McRae (Shriners Hospitals for Children, Philadelphia, USA); Therese Johnston (Shriners Hospitals for Children, Philadelphia, USA); Ken Hunt (Centre for Rehabilitation Engineering, University of Glasgow, United Kingdom); Richard Lauer (Shriners Hospitals for Children, Philadelphia, USA)

12:15 **Cardiorespiratory and Metabolic Responses during FES-Leg Cycling and Hybrid FES-Gait in SCI Individuals**

Glen Davis (The University of Sydney, Australia); Anna Lauffer (University of Sydney, Australia); Jack Crosbie (University of Sydney, Australia); Jacqui Raymond (University of Sydney, Australia); Michael Russold (Otto Bock Healthcare Products GmbH, Austria); Che Fornusek (The University of Sydney, Australia); Gustavo Braz (University of Sydney, Australia); Luciola Menezes (University of Sydney, Australia); James Middleton (University of Sydney, Australia)

12:30 **Potential application of a passive cycling training as a tool for modulating spinal H-reflex pathways in post-acute stroke patients: a feasibility study**
Simona Ferrante (Politecnico di Milano, Italy); Emilia Ambrosini (Politecnico di Milano, Italy); Alessandra Pedrocchi (Politecnico di Milano, Italy); Giancarlo Ferrigno (Politecnico di Milano, Italy); Franco Molteni (Valduce Hospital, Villa Beretta Rehabilitation Center, Italy); Riccardo Mazzocchio (Università di Siena, Italy)

12:45 - 13:30 Lunch Break

13:30 - 18:00 Lab Tours & Excursion
1. IMTEK, Building 102-104
2. University Hospital
3. City Tour

19:00 -22:00 Conference Dinner
Historic Merchant's Hall

Thursday, September 25, 2008

KN4: Keynote Lecture 4

08:30 - 09:00 Biocompatibility of Central Nervous System Probes

Eduardo Fernández (University Miguel Hernández, Spain)

The manner in which a mutually acceptable co-existence of biomaterials and nervous system cells is developed and sustained is essential for long-term neuroprosthetic applications and has been the focus of attention for many years. Microelectrode implantation triggers a large network of morphological and metabolic changes that can be modulated. It is essential to understand the signals that lead to neuroglial activation and create a targeted intervention to control the response, reduce the adverse nature of the reactions and maintain an ideal environment for the brain-electrode interface.

S11: Oral Session 11

09:15 - 10:30 FES for Denervated Muscles"

Session Chairs: *Winfried Mayr (Medical University of Vienna, Austria)*
Thordur Helgason (Landspítali - University Hospital, Iceland)

09:15 **The European R&D project RISE - Use of electrical stimulation to restore standing in paraplegics with long-term denervated degenerated muscles (DDM)**
Winfried Mayr (Medical University of Vienna, Austria); Christian Hofer (Ludwig Boltzmann Institute of Electrical Stimulation and Physical Rehabilitation, Austria); Helmut Kern (Wilhelminenspital Wien, Austria); Manfred Bijak (Medical University of Vienna, Austria); Hermann Lanmüller (Medical University of Vienna, Austria); Dietmar Rafolt (Medical University of Vienna, Austria); Hans Stöhr (Medical University of Vienna, Austria); Ewald Unger (Medical University of Vienna, Austria)

09:30	<p>Second generation stimulation equipment for Denervated Muscles in the scope of the EU project RISE <i>Manfred Bijak (Medical University of Vienna, Austria); Ewald Unger (Medical University of Vienna, Austria); Christian Hofer (Ludwig Boltzmann Institute of Electrical Stimulation and Physical Rehabilitation, Austria); Hermann Lanmüller (Medical University of Vienna, Austria); Dietmar Rafolt (Medical University of Vienna, Austria); Winfried Mayr (Medical University of Vienna, Austria)</i></p>	<p><i>University Montpellier 1, France); David Guiraud (INRIA, France); Mitsuhiro Hayashibe (DEMAR team INRIA-LIRMM, France); Alain Varray (Motor Efficiency and Deficiency Laboratory, University Montpellier 1, France)</i></p>
09:45	<p>Monitoring of Knee Joint Mechanics during Electrical Treatment of Denervated Degenerated Muscles <i>Thordur Helgason (Landspítali - University Hospital, Iceland); Brynjar Vatnsdal (Landspítali-University Hospital, Iceland)</i></p>	<p>11:15 Development of a Hill-type model to predict the energetics of sub-tetanic electrical stimulation of muscle. A Pilot Study. <i>Conor Minogue (Bio-medical Research (BMR) Ltd., Ireland); Louis Crowe (University College Dublin, Ireland); Brian Caulfield (University College Dublin, Ireland); Madeleine Lowery (University College Dublin, Ireland); Richard Reilly (Trinity College Dublin, Ireland)</i></p>
10:00	<p>Denervated and degenerated muscle stimulation: advanced image processing techniques and 3-dimensional rendering to monitor muscles restoration <i>Paolo Gargiulo (University Hospital of Iceland Landspítali, Iceland)</i></p>	<p>11:30 Time Delay from Muscle Activation to Torque Generation during Quiet Stance: Implications for Closed-Loop Control via FES <i>Albert Vette (University of Toronto, Canada); Kei Masani (University of Toronto, Canada); Milos Popovic (University of Toronto, Canada)</i></p>
10:15	<p>Analysis of surface electrical stimulation of the human anterior tibialis muscle: A modelling study of a denervated human skeletal muscle <i>Juliana (Hee-Kyung) Kim (The University of Auckland, New Zealand)</i></p>	<p>11:45 Development of closed loop FES controllers for trunk stabilization in paraplegia <i>Michele Vanoncini (University of Reading, United Kingdom); William Holderbaum (School of System Engineering, United Kingdom); Brian Andrews (Oxford Brookes University, United Kingdom)</i></p>
10:30 - 11:00 Coffee Break		
S12: Oral Session 12		
11:00 - 12:15	<p>Modelling & Control" Session Chairs: <i>Silvestro Micera (Institute for Biorobotics, Italy)</i> <i>Thomas Schauer (Technische Universität Berlin, Germany)</i></p>	<p>12:00 Neural Oscillator based Control for Wrist Tremor Attenuation via FES <i>Dingguo Zhang (Lirmm, France); Philippe Pognet (Laboratory LIRMM, UMR CNRS 5506, University of Montpellier II, France); Wei Tech Ang (Nanyang Technological University, Singapore)</i></p>
11:00	<p>An activation model of motor response and H-reflex under FES <i>Floor Campfens (University of Twente, The Netherlands); Maria Papaioordanidou (Motor Efficiency and Deficiency Laboratory,</i></p>	<p style="background-color: #e0e0e0; padding: 5px;">12:15 - 12:45 Closing Ceremony</p> <p style="background-color: #e0e0e0; padding: 5px;">12:45 - 13:30 IFESS General Meeting</p>

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*1 - Hausdorff JM, et al. Am J Phys Med Rehabil. 2008;37(11):4-13. 2 - Hausdorff JM, et al. J Neurol Phys Ther. 2006; Dec 30 (4):209-22. 3 - Alon G, et al. Stroke and Cerebrovascular Dis. 2002;11:99-106.
4 - Alon G, et al. Neurorehabilitation. 2003;18(3):215-225. 5 - Ding H, et al. Rehab Med. 2005; 3:232-36.*

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(Poster Session 2 - Mo. 22.09.2008 - 17.00-18.00 Uhr - Neuromodulation)

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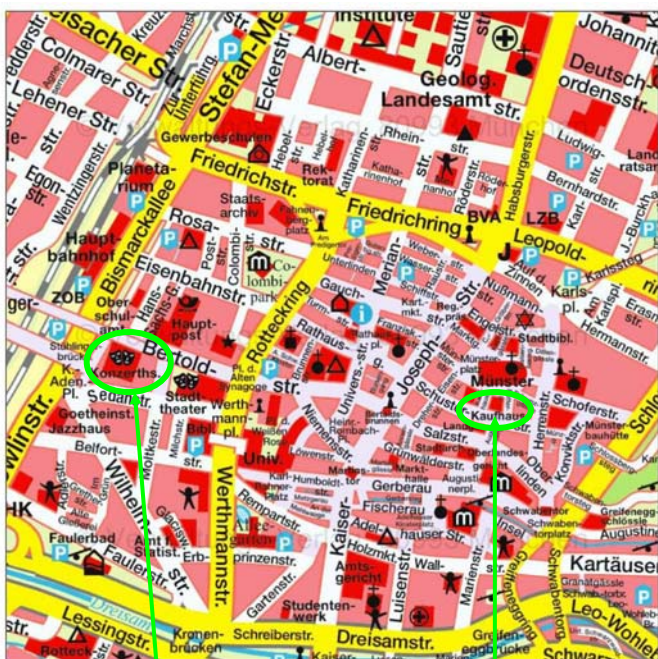
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