

## **Thursday – Teaching Workshop**

### **13:00 - 14:00 Define the HFO (Opening remarks by Jean Gotman and Philippe Kahane)**

13:00 - 13:30 A new set of frequencies – define an HFO: What will we be talking about  
Jean Gotman, Canada

13:30 - 14:00 How does the brain generate HFOs – basic science explained for clinicians  
Premysl Jiruska, Czech Republic

### **14:00 - 16:00 Identify the HFO**

14:00 - 14:25 Visual identification of interictal intracranial HFOs – Julia Jacobs, Germany

14:25 - 14:50 Pitfalls of identifying ictal and interictal HFOs – Greg Worrell, USA

14:50 - 15:15 Automatic detection – different types of detection algorithms, validation and adaptation – Fabrice Wendling, France

15:15 - 15:35 Identification of scalp HFOs – Maeike Zijlmans, Netherlands

15:35 - 16:00 High frequency activity patterns at seizure onset – Philippe Kahane, France

### **16:00 - 16:30 Coffee break**

### **16:30 - 18:30 Helpful tools: A hands-on session**

**Chair: Matthias Dümpelmann, Germany**

Matthias Dümpelmann, University Medical Center Freiburg, Freiburg, Germany

Cristian Donos, University of Bucharest, Bucharest, Rumania, University

Medical Center Freiburg, Freiburg, Germany

Peter Höller, Department of Neurology, Christian-Doppler-Medical Centre, Paracelsus Medical University Salzburg, Austria

Sergey Burnos, Universitätsspital, Klinik für Neurochirurgie, Zürich, Switzerland

Tommaso Fedele, Universitätsspital, Klinik für Neurochirurgie, Zürich, Switzerland

Miguel Navarrete, University of Los Andes - ICM Institut du Cerveau et de la Moelle épinière, Colombia

Christiano Rizzo, Micromed S.p.A., Mogliano Veneto, Italy

Sabine Wuytens, OSG BVBA, Rumst, Belgium

In this session participants will be organized into small work groups and will be able to analyze two example EEG files with different tool boxes. Six computers will be equipped with different tool boxes and participants will have time to spend around 15 min at each computer station.

16:30 - 16:50 Short intro to the different tools

16:50 - 18:10 Hands on at computer stations

18:10 - 18:30 Questions and answers

After 18:30 Optional Dinner at “Ganter” brewery (with registration)

## **Friday – Scientific Session**

### **Opening remarks by Julia Jacobs and Andreas Schulze-Bonhage**

### **8:30 - 10:30 Session 1 (Chair: M. Le Van Quyen/P. Jiruska):**

#### **HFOs and Ictogenesis**

8:30 - 9:00 HFOs at the time of seizure onset – evidence from animal models – Massimo Avoli, Canada

9:00 - 9:30 Mechanisms of hippocampal HFOs – Liset Menendez de la Prida, Spain

9:30 - 10:00 Ictal occurrence of HFOs in human epilepsy – Catherine Schevon, USA

10:00-10:30 Is high frequency activity always part of the seizure onset pattern in humans? – Fabrice Bartolomei, France

### **10:30 - 11:00 Coffee break**

### **11:00 - 13:00 Session 2 (Chair: L. Menendez de la Prida/P. Engel):**

#### **Physiological vs Pathological High Frequencies**

11:00 - 11:30 Mechanisms of physiological and pathological – HFOs – Catalina Alvarado-Rojas, Colombia

11:30 - 12:00 Localization of physiological and pathological – HFOs – Eishi Asano, USA

12:00 - 12:30 Differentiating the good and bad in clinical – Recordings – Jan Cimbalnik, USA

12:30 - 13:00 Physiological HFA vs physiological HFOs – Nathan Crone, USA

### **13:00 - 14:00 Lunch break**

### **14:00 - 15:40 Session 3 (Chair: M. Zijlmans/A. Ikeda):**

#### **Modulators of HFOs**

14:00 - 14:20 Influence of pathology on HFOs – Rick Staba, USA

14:20 - 14:40 Influence of sleep on HFOs – Birgit Frauscher, Canada

14:40 - 15:00 Interactions between spikes and HFOs – Julia Jacobs, Germany  
15:00 - 15:20 Effect of medication on HFOs – Stefan Rampp, Germany  
15:20 - 15:40 Stimulation and HFOs (high frequency, single pulse, TMS) – Maryse van 't Klooster, Netherlands

**15:40 - 16:00 Coffee Break**

**16:00 - 18:00 Session 4 (Chair: N. Crone/ E. Asano)**

**Is there only one kind of HFO?**

16:00 - 16:30 How is gamma activity related to ripples? – Olivier David, France  
16:30 - 17:00 Interictal and ictal HFOs – Michel Le Van Quyen, France  
17:00 - 17:20 DC and HFO – Akio Ikeda, Japan  
17:20 - 17:40 Very HFO – Naotaka Usui, Japan

**17:40 - 18:00 Discussion Round**

**19:00 Common evening at the Restaurant Dattler in Freiburg (with registration)**

**Saturday – Scientific Program**

**8:30 - 10:00 Session 5 (Chair: A. Schulze-Bonhage/G. Worrell)**

**New developments in analyzing HFOs**

**8:30 - 9:00 How do we record and analyze HFOs?**

Micro vs. macro electrodes, automatic vs. visual analysis – Jean Gotman, Canada

Development of new electrodes

9:00 - 9:20 Grid electrodes – Thomas Stieglitz, Germany  
9:20 - 9:40 Depth electrodes – Andrei Barborica, Romania

9:40 - 10:00 HFOs recorded with MEG – Marcel Heers, Germany

**10:00 - 10:30 Coffee break**

**10:30 - 12:30 Platform (8 min presentation, 2 min discussion each)**

(10 min talks from submitted abstracts)

van Klink, Nicole: Ripples on Rolandic spikes: A marker of epilepsy severity

Weiss, Shennan: Ripples recorded from mesial temporal epileptogenic brain are phase amplitude coupled to inter-ictal discharges and theta oscillations

Leiken, Kimberly: Magnetoencephalography detection of high-frequency oscillations in the developing brain

Bokodi, Virág: Cortical electrical stimulation evoked high frequency oscillations in the human hippocampus

Burnos, Sergey: Relation of automatically detected High Frequency Oscillations (HFOs) with the seizure onset zone SOZ and clinical outcome

Zweiphenning, Willemeik: High frequency oscillations and high frequency functional network characteristics in the intra-operative electrocorticogram in temporal lobe epilepsy

Lopour, Beth: A Simple Statistical Method for the Automatic Detection of High Frequency Oscillations in Human Intracranial EEG

Niediek, Johannes: Reactivation of semantically invariant neurons during HFOs in the human medial temporal lobe during sleep

Stacey, William: Generic mechanisms of pathological and normal HFOs: An analytical approach

**12:30 - 14:00 Lunch and Poster session**

**14:00 - 15:30 Session 6 (Chair: J. Jacobs, M. van't Klooster )**

**HFOs in the pediatric population**

14:00 - 14:30 Intra-cranial HFO analysis in pediatric epilepsy – Hiroshi Otsubo, Canada

14:30 - 15:00 Scalp HFOs in various childhood epilepsies – Katsuhiro Kobayashi, Japan

15:00 - 15:30 HFOs to measure disease activity with scalp EEG – Joyce Wu, USA

**15:30 - 18:00 Session 7 (Chair: P. Engel, P. Kahane)**

**What is the evidence for clinical use of HFOs**

15:30 - 15:50 A meta-Analysis of published trials – Yvonne Höller, Austria

15:50 - 16:10 Current evidence from intraoperative recordings – Maeike Zijlmans, Netherlands

16:10 - 16:30 Cochrane Institute: What would be needed for first class evidence? – Gerd Antes, Germany

16:30 - 16:40 Discussion: What do we need for a multicenter trial?

**16:40-16:50 Coffee break**

**16:50 - 17:45 The clinical challenge: 5 min presentation each**

Curot, Jonathan: New hybrid micro-macroelectrodes to record fast ripples in patients with drug-refractory epilepsy

Hartlieb, Till: Epilepsy center for children & adolescents Schön Klinik Vogtareuth

Iwasaki, Masaki: Use of interictal HFOs in Tohoku University Hospital Epilepsy Center

Jiruska, Premysl: Experience with high-frequency oscillations at Epilepsy Centre Motol in Prague

Klimeš, Petr: HFOs in Brno Epilepsy Center

Gliske, Stephen; Stacey, William: Continuous, long term, automated HFO identification: the Michigan experience

van Klink, Nicole: Clinical use of High Frequency Oscillations in UMC Utrecht: Practice what you preach

Zhang, Bingqing: Epilepsy Center of Tsinghua University Yuquan Hospital

**Discussion of abstracts**

**17:45 - 18:00 Concluding remarks: Have we learned anything critically important from HFOs? – Pete Engel – USA**