

**Educational course: Neuroimaging – 28.11.2022 – 30.11.2022,**

**Location: CEITEC MU, Brno, Czech Republic,**

**Masaryk University Campus, Building E35, Seminar room 145**

**Detailed program**

**Monday 28<sup>th</sup> November**

Time	Description
8:30-9:00	Registration of participants
9:00 – 9:40	<b>Introduction to the course</b> ( <i>Michal Mikl</i> ) <b>Anatomical and physiological backgrounds to brain mapping</b> ( <i>Robert Roman</i> )
9:40 – 10:45	<b>Electrophysiological methods in brain mapping</b> <ul style="list-style-type: none"><li>• EEG signal processing and analysis (<i>Martin Lamoš</i>)</li><li>• SignalPlant - software for EEG data handling and deep learning (<i>Filip Plešinger</i>)</li></ul>
10:45 – 11:00	Coffee break
11:00 – 12:30	<b>Overview of MRI principles for non-physicists</b> ( <i>Zenon Starčuk</i> )
12:30 – 13:30	Lunch
13:30 – 15:00	<b>fMRI basics</b> <ul style="list-style-type: none"><li>• Principles of fMRI (<i>Michal Mikl</i>)</li><li>• fMRI data preprocessing (<i>Anežka Kovářová</i>)</li><li>• Statistical analysis of fMRI data (<i>Martin Gajdoš</i>)</li><li>• Overview of connectivity, resting-state fMRI studies, independent component analysis (<i>Marie Nováková</i>)</li></ul>
15:00 – 15:15	Coffee break
15:15 – 16:45	<b>fMRI advanced</b> <ul style="list-style-type: none"><li>• Seed analysis and Psycho-physiological interactions (<i>Marek Bartoň</i>)</li><li>• Granger causality and Dynamic causal modelling (<i>Martin Gajdoš</i>)</li><li>• Introduction to dynamic connectivity (<i>Martin Gajdoš</i>)</li><li>• Real-time fMRI neurofeedback and its application to psychiatric disorders (<i>Pavla Linhartová</i>)</li></ul>

## Tuesday 29<sup>th</sup> November

Time	Description
9:00 – 10:00	<b>Principles of DWI and fiber tracking</b> ( <i>Michaela Bartoňová</i> )
10:00 – 10:25	<b>Morphometry – part I</b> <ul style="list-style-type: none"> <li>• <b>Principles and methods of brain morphometry</b> (<i>Pavel Říha</i>)</li> </ul>
10:25 – 10:40	Coffee break
10:40 – 11:00	<b>Morphometry – part II</b> <ul style="list-style-type: none"> <li>• <b>Group analysis in morphometry and another advanced topics</b> (<i>Radek Mareček</i>)</li> </ul>
11:00 – 12:15	<b>Electrophysiology and fMRI</b> <ul style="list-style-type: none"> <li>• <b>Simultaneous EEG-fMRI</b> (<i>Radek Mareček</i>)</li> <li>• <b>EEG microstates</b> (<i>Tomáš Jordánek</i>)</li> </ul>
12:15 – 13:15	Lunch
13:15 – 15:00	<b>Practical session in MRI labs</b> <ul style="list-style-type: none"> <li>• Placed at MAFIL labs (2<sup>nd</sup> underground floor)</li> <li>• Two parallel groups: A) simultaneous EEG-fMRI recording, B) advanced fMRI approaches and fMRI accessories</li> </ul>
15:00 – 15:15	Coffee break
15:15 – 16:30	<b>Advanced neuroimaging topics</b> <ul style="list-style-type: none"> <li>• <b>Brain graphs: persistent dojmology and other stories</b> (<i>Jaroslav Hlinka</i>)</li> <li>• <b>How to prepare acquisition of fMRI data</b> (<i>Michal Mikl</i>)</li> <li>• <b>Data quality and related issues, examples of wrong interpretation</b> (<i>Marie Nováková</i>)</li> </ul>

## Wednesday 30<sup>th</sup> November

Time	Description
9:00 – 10:30	<b>Noninvasive brain stimulation techniques</b> <ul style="list-style-type: none"> <li>• <i>To be announced</i> (<i>Luboš Brabenec and colleagues</i>)</li> </ul>
10:30 – 10:45	Coffee break
10:45 – 11:30	<b>Differences between animal and human studies. technical aspects of animal studies. Quantitative imaging, physiological models, and Perfusion</b> ( <i>Radovan Jiřík</i> )
11:30 – 12:15	<b>Neuroimaging studies and data – practical aspects</b> <ul style="list-style-type: none"> <li>• <b>How to prepare and conduct neuroimaging study – practical hints</b> (<i>Michal Mikl</i>)</li> <li>• <b>Data workflow and data formats in neuroimaging. FAIR data, preparation of publicly available datasets</b> (<i>Tomáš Slaviček</i>)</li> </ul>
12:15 – 13:15	Lunch
13:15 – 15:30	<b>fMRI data processing - practical session</b> Introduction to SPM12 and preparation to data processing ( <i>Michal Mikl</i> ) Processing of fMRI data in SPM12 with example dataset ( <i>Martin Gajdoš</i> )