

Professor Christoph Michel is an EEG specialist with high international reputation. His main research interests are the analysis of EEG-patterns correlated with complex cerebral information processing and their visualization in the anatomical context. Prof. Michel is heading a study group at the Department of Neuroscience, Campus Biotech of the University of Geneva, Switzerland. His group analyses neuronal networks using a comprehensive, multidisciplinary approach by integrating data from a variety of functional methods, such as fMRI, intracerebral EEG-recordings in patients, or the activity of neural networks in response to transcranial magnetic stimulation, and neuropsychology tests. The research activities focus on investigations of brain functions such as visuo-motor integration, multisensory interaction, language, memory and emotion. Projects with direct clinical relationship aim at studying the plasticity mechanisms after brain lesions or the localization of epileptic activity in patients with partial epilepsy.

Epilepsy is since many years conceptualized as a neurological disease affecting significantly the activity of large-scale neural networks. Thus a considerable amount of compelling evidence exists for the existence of specific cortical and subcortical networks in the genesis and expression of partial- and generalized-onset seizures. The visualization of these network structures could hypothetically not only improve the treatment of refractory epilepsy with deep brain stimulation but could also optimize the classical resective-neurosurgical therapy of epileptic patients.

Selected Publications:

Sheybani L, Birot G, Seeck M, Schaller K, Michel CM, and Quairiaux C. Focal epilepsy leads to the development of a self-sustained large-scale epileptic network. *Brain*, (in review).

Karunakaran S, Chowdhury A, Donato F, Quairiaux C, Michel CM, Caroni P. PV plasticity sustained through D1/5 dopamine signaling required for long-term memory consolidation. *Nature Neuroscience*, 2016, 19(3):454-64.

Plomp G, Quairiaux C, Astolfi L, Michel CM. The physiological plausibility of time-varying Partial Directed Coherence: normalization and weighting by spectral power. *Neuroimage*, 2014, 15;97:206-16.

Quairiaux C, Plomp G, Kiss JZ, Astolfi L, Michel CM. Dynamic connectivity among cortical layers in local and large-scale sensory processing. *European Journal of Neuroscience*, 2014, 40(8):3215-23.

Quairiaux C, Megevand P, Kiss JZ, Michel CM. Functional development of large-scale sensorimotor cortical networks in the rat brain. *The Journal of Neuroscience*, 2011, 31:9574-9584.

Michel CM, Murray M, Lantz G, Gonzalez S, Grave de Peralta R. EEG Source Imaging. Invited Review. *Clinical Neurophysiology*, 2004, 115: 2195-2222.

Mohr C, Michel CM, Lantz G, Ortigue S, Viaud-Delmon I, Landis T. Brain state dependent functional hemispheric specialization in men but not women. *Cerebral Cortex*, 2005, 15:1451-1458.

Michel CM, Lantz G, Spinelli L, Grave de Peralta R, Landis T, Seeck M. 128-channel EEG source imaging in epilepsy: clinical yield and localization precision. *Journal of Clinical Neurophysiology*, 2004; 21:71-83.