



**Universität  
Zürich** UZH

Mittelbaukolloquium des Psychologischen Instituts  
Leitung: Dr. Michel Druey und Dipl.-Psych. Pamela Rackow

HS 2012

**Datum:** 28.11.2012

**Ort:** Binzmühlestrasse 14, Raum BIN 3.D.27

**Uhrzeit:** 12.30 –13.30Uhr

**Titel:** Valid, Sensitive, Interpretable: A Novel Approach to EEG Analysis

**Referent:** Dr. Armand Mensen

**Abstract:**

Advances in EEG signal analysis and its combination with other investigative techniques make appropriate statistical analysis of large EEG datasets a crucial issue. With an increasing number of available channels and samples, as well as more exploratory experimental designs, it has become necessary to develop a statistical process with a high level of statistical integrity, signal sensitivity which nonetheless produces results which are interpretable to the common user. Threshold-free cluster-enhancement has recently been proposed as a useful analysis tool for fMRI datasets. This approach essentially takes into account both a data point's statistical intensity and neighbourhood to transform the original signal into a more intuitive understanding of 'real' differences between groups or conditions. Here we adapt this approach to optimally deal with EEG datasets and use permutation-based statistics to build an efficient statistical analysis. Furthermore we compare the results with several other non-parametric and parametric approaches currently available using realistic simulated EEG signals. The proposed method is shown to be generally more sensitive to the variety of signal types common to EEG datasets without the need for any arbitrary adjusting of parameters. Moreover, a unique p-value is produced for each channel-sample pair such that specific questions can still be asked of the dataset while providing general information regarding the large-scale experimental effects.