

# Cortical responses evoked by wrist joint manipulation

Alfred C. Schouten, Martijn P. Vlaar, Alistair N. Vardy Teodoro Solis-Escalante,  
Frans C.T. van der Helm

Delft University of Technology, Faculty of Mechanical, Maritime and Materials Engineering,  
Department of Biomechanical Engineering

February 20, 2019; contact: [a.c.schouten@tudelft.nl](mailto:a.c.schouten@tudelft.nl)

## Introduction

This data features the response in the cortex, measured using electroencephalography (EEG), to manipulations of the wrist joint applied by a robotic manipulator. Details on the experimental protocol, data acquisition and processing are given in the articles (Vlaar et al. 2017, Vlaar et al. 2018).

## Data description

The experimental data were acquired from ten healthy volunteers at the Delft University of Technology. The experimental procedure was approved by the Human Research Ethics Committee of the Delft University of Technology. The data is provided as Matlab files and were tested on Matlab R2018b. The following files are included:

file name	description
dataEEG_XX_YY.mat	The data files of the participants; _XX indicates data from the relax (T1) and the active (T2) task; _YY indicates the participant number (2 till 12; note that 1 and 6 are not included). In total, twenty files are included.
layout_EEG.mat	Layout of the EEG, including the names of recorded EEG channels
ica_mat.mat	Results of the Independent Component Analysis (ICA), see also Vlaar et al. 2018.
Load_plot_data.m	A Matlab script to load and plot relevant time-series. Includes additional information on the structure of the data files.

## Acknowledgements

This research was funded by the European Research Council under the European Union's Seventh Framework Programme (FP/2007-2013) ERC Grant Agreement n. 291339, project 4DEEG: A new tool to investigate the spatial and temporal activity patterns in the brain.

## References

1. Vlaar MP, Solis-Escalante T, Vardy AN, van der Helm FCT, Schouten AC, *Quantifying Nonlinear Contributions to Cortical Responses Evoked by Continuous Wrist Manipulation*, IEEE Trans Neural Syst Rehabil Eng 25: 481-491, 2017.
2. Vlaar MP, Birpoutsoukis G, Lataire J, Schoukens M, Schouten AC, Schoukens J, van der Helm FCT, *Modeling the Nonlinear Cortical Response in EEG Evoked by Wrist Joint Manipulation*, IEEE Trans Neural Syst Rehabil Eng 26:205-305, 2018