# EEG and MEG Source Reconstruction with FieldTrip

Full Day Course / 8:00-16:30

**Organizers:**

*Maria Carla Piastra*
Universiy of Münster, Germany

*Simon Homölle*
Donders Institute, Netherlands

*Robert Oostenveld*
Radboud University, Netherlands

*Sophie Schrader*
University of Münster, Germany

MEG and EEG channel data provides limited information about the specific cortical regions involved in electric and magnetic brain activities. Source reconstruction overcomes these limitations and gives more insight into cortical activity.

The easiest approach for source reconstruction is to use a spherical representation of the human head or a semirealistic template. There are scenarios in which this approximation leads to inaccurate and unreliable source reconstruction results.

We will therefore demonstrate an easy-to-use MATLAB analysis pipeline based on the FieldTrip toolbox to increase the accuracy of the source analysis by using individualized realistically shaped volume conductor head models using individual anatomical data and the finite element method (FEM).

This full-day educational course will give a comprehensive overview on the current state-of-the-art of MEG and EEG analysis and source reconstruction. During the workshop, the participants will work with a tutorial dataset and learn all important steps to preprocess data and accurately reconstruct cortical activity using the FEM and different inverse solutions.

Particular care will be taken to provide hands-on training to the audience on robust and state-of-the-art source reconstruction methods for both basic and advanced MEG/EEG study designs.

*Please note the following computer requirements for this course:*
-Bring your own computer with MatLab software and license (suggested 2015b and upwards).
-The OS we suggest to fully follow the hands-on session is Ubuntu.

**Course Schedule:**

8:00-8:30
**Welcome and getting started**

8:30-9:20

**Lecture: Preprocessing of MEG/EEG datasets and channel-level analysis**

*Sophie Schrader, University of Münster, Germany*

9:20-10:40

**Hands-On Session: Preprocessing of MEG/EEG datasets and channel-level analysis with the FieldTrip toolbox**

*Sophie Schrader, University of Münster, Germany*

10:40-11:00

**Break**

11:00-12:00

**Lecture: MEG/EEG forward modeling using realistically shaped finite element head models**

*Maria Carla Piastra, Universiy of Münster, Germany*

12:00-13:00

**Lunch**

13:00-14:00

**Hands-On Session: MEG/EEG forward modeling using realistically shaped finite element head models with the FieldTrip toolbox**

*Maria Carla Piastra, Universiy of Münster, Germany*

14:00-14:45

**Lecture: Inverse solutions for the reconstruction of cortical activity recorded with MEG/EEG**

*Simon Homölle, Donders Institute, Netherlands*

14:45-15:00

**Break**

15:00-16:00

**Hands-on Session: Inverse solutions for the reconstruction of cortical activity recorded with MEG/EEG using the FieldTrip toolbox**

*Simon Homölle, Donders Institute, Netherlands*

16:00-16:30

**Questions and Answers**