



**IMPRS NeuroCom Course**  
**"Basic Electroencephalography (EEG) and Magnetoencephalography (MEG)"**  
**(with Theoretical and Practical Part)**  
**10 – 24 May 2022**

**Lecturer: Prof. Dr Thomas Knoesche & Dr Burkhard Maess**

**Course syllabus:** Students will learn the basics of EEG & MEG including signal generation and measurement. They will be introduced into time-series analysis, time-frequency analysis, source localization and spatio-temporal modeling, and fusion with other modalities (e.g., local field potentials, DTI, fMRI). Based on this overview of available experimental techniques, their pros and cons as well as specific prerequisites can be assessed and various kinds of data analysis methods can be performed. The latter will be trained in practical sessions.

**Course credits and conditions:** 2 ECTS; At least 80% course participation and successfully presenting and discussing a paper relevant to the content of the lecture series in a separate half-day session after the lecture series.

Date	Time	Topic	Room
Tue, 10.05.22	09.00–10.30	MEG & EEG: Signal generation and instrumentation.	Lecture Hall
	10.30–10.45	<b>Break</b>	
	10.45–12.15	Signal processing: Temporal filtering, artifact treatment, SSP, event related design.	Lecture Hall
	12.15–13.45	<b>Lunch Break</b>	
	13.15–14.45	Practical session: Preprocessing. Goal: artifact free trial and averages.	Computer Training Room
Fri, 13.05.22	09.00–10.30	Signal Decomposition: Extraction of functional components and separation from noise. - based on statistics: ICA, DSSP - based on source reconstruction	Lecture Hall
	10.30–10.45	<b>Break</b>	
	10.45–12.15	- based on frequency decomposition	Lecture Hall
Tue, 17.05.22	09.00–10.30	Practical session: Dipole localization from time-averaged data.	Computer Training Room
	10.30–10.45	<b>Break</b>	
	10.45–12.15	Practical session: Beamformer with time-frequency data.	Computer Training Room
Fri, 20.05.22	09.00–10.30	Network Analysis (I), as follow-up analysis and as additional constraint for decomposition. - connectivity analysis - dynamic modeling - neural mass model	Lecture Hall
	10.30–10.45	<b>Break</b>	
	10.45–12.15	Network Analysis , continued.	Lecture Hall
Tue, 24.05.22	09.00–10.30	Practical session: Beamformer of time-frequency data (DICS).	Computer Training Room
	10.30–10.45	<b>Break</b>	
	10.45–12.15	Practical session: Beamformer of time-frequency data (DICS)., continued.	Computer Training Room
	13.15–14.45	General discussion. - compare EEG-MEG vs. other methods - compare Sensor Space vs. Brain Signals	Lecture Hall

**Organiser:**

International Max Planck Research School on Communication: Function, Structure, and Plasticity (IMPRS NeuroCom)

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**Venue:** Max Planck Institute for Human Cognitive and Brain Sciences, Stephanstr. 1A, 04103 Leipzig, Germany

**Registration:** <https://survey.academiccloud.de/index.php/953546?lang=en>



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