

Course: Spectral analysis of time series in neuroscience – Fundamental methods

The 1-day course addresses fundamental aspects of spectral analysis without diving much into theory, just from a practical point of view. The aim is to provide a fundamental understanding of the different techniques out there to avoid mistakes, artefacts and to be able to choose the best technique for the own data. The course is planned like an interactive workshop, where we discuss analysis techniques and clarify open questions and possibly fill gaps of methodology understanding.

The course content addresses non-specialists in mathematical analysis, e.g. researchers with education in neurobiology, medicine or psychology, but of course it is also open to theory-oriented researchers who intend to understand the practical side of spectral analysis in neuroscience. Possible topics to be discussed are, e.g.:

- Sampling theory
- Fourier analysis and its possible artefacts, e.g. aliasing, spectral leakage
- Time-frequency analysis (Short-Time Fourier Transform, Wavelet Transform, Hilbert Transform and Empirical Mode Decomposition) and its limits in applications
- Synchronisation, coherence and Phase-Amplitude Coupling

Event information:

- Location: Bernstein Center Freiburg im Breisgau, Großer Hörsaal, Hansastr. 9a, 79104 Freiburg, Germany (<https://www.bcf.uni-freiburg.de>)
- Date of course and time: Friday, November 27, 2026, 9:15-15:45
- Registration: Send an email to Axel Hutt (email address: first name.lastname at inria.fr)
- Registration deadline: Monday, November 9, 2026
- Registration fee: none, free of charge

The course is supported by the Neurowissenschaftliche Gesellschaft (<https://www.nwg-info.de/>).