Techniques to record neuronal data from populations of neurons are rapidly improving. Simultaneous recordings from hundreds of channels are possible while animals perform complex behavioral tasks. The analysis of such massive and complex data becomes increasingly challenging. This advanced course aims at providing deeper training in state-of-the-art analysis approaches in systems neuroscience.

The course is addressed to excellent master and PhD students and young researchers who are interested in learning advanced techniques in data analytics and in getting hands-on experience in the analysis of electrophysiological data. Internationally renowned researchers will give lectures on statistical data analysis and data mining methods with accompanying exercises. Students will define and perform their own analyses on provided data to solve a challenge. Participants are required to have a strong interest in data analysis, a background in a field with a strong mathematical relation, knowledge of algebra, matrix operations, and statistics, and need to have solid programming experiences (preferably in Python).

### Topics covered

- Single neuron properties and statistics
- Stochastic processes
- Surrogate methods
- Detection of spatio-temporal patterns
- Unitary Events
- Statistical analysis of massively parallel spike data
- Higher-order correlation analyses
- Elephant toolbox
- Spike-LFP relationship
- Population coding
- State space analysis
- Machine learning
- Data mining
- Research data management
- Reproducibility
- Data sharing

### Faculty

- **Michael Denker**  
  Jülich Research Center, Germany
- **Udo Ernst**  
  Univ Bremen, Germany
- **Sonja Grün**  
  Jülich Research Center, Germany
- **RWTH Aachen Univ, Germany**
- **Björn Kampa**  
  RWTH Aachen Univ, Germany
- **Adam Kohn**  
  Albert Einstein College of Medicine, New York, USA
- **Jakob Macke**  
  Technical Univ Munich, Germany
- **Luca Mazzucato**  
  Univ of Oregon, Eugene, USA
- **Martin Nawrot**  
  Univ of Cologne, Germany
- **Yifat Prut**  
  Hebrew Univ, Jerusalem, Israel
- **Hansjörg Scherberger**  
  German Primate Center, Göttingen, Germany
- **Thomas Wachtler**  
  G-Node, LMU Munich, Germany

### Date and Venue

**April 19 - 29, 2021**

Due to Covid-19, this year the course will be taught online.

### Deadline

Deadline for application is January 31, 2021

---

**More Information**

http://www.g-node.org/anda