



FaPra: Computational EEG analyses

You want to understand human brains? We too. We want to use **computational methods** to apply to brain data – mostly for **EEG analysis**. These methods have very broad applications, enabling accurate EEG analyses from simple laboratory experiments, to complex real-world, or VR EEG studies.

Recently, the **Julia** programming language gained lots of traction due to its well-designed syntax, integrated reproducible packet-management and because it appears to solve the 2-language problem (Julia is as easy as python, but (nearly) as fast as C). Due to the computational complexity, but also the necessary scientific flexibility, many researchers switch to Julia. Therefore, nearly all implementations in this FaPra will be done in Julia.

We here propose several projects for 1-3 students each – but we are also open for own ideas (please reach out before). The projects typically touch upon: **timeseries / data analysis, visualization, statistics, methods evaluation, machine learning, science-communication**.

In the past groups have worked on toolboxes ([UnfoldMakie.jl](#), [ClusterDepth.jl](#), [Amica.jl](#)), developed GUIs, new Brain-Computer-Interfaces, interactive-explorables ([featured-notebooks](#)), simulations of EEG data and much more.

We will meet with each group for 30min / week or 1h / 2 weeks to discuss issues and provide help. In addition, we can discuss issues via email/chat. In case of low number of interested students, individual plans will be made.

In addition, we will all meet every 3-4 weeks for a group-discussion, updating each other on the progress being made. This will involve short presentations of each group of 10min each.

The grade consists of:

- 20% Interactions & Presentation Skills
- 30% Implementation Code & Documentation
- 50% Report (up to 8 pages)

The report can be structure as a typical conference paper.

If you are interested in specifics, I am happy to send you the project descriptions. Contact me: benedikt.ehinger@vis.uni-stuttgart.de