Brain connectivity between brain regions is commonly computed based on univariate signals, i.e. activity patterns are collapsed across voxels per region. This neglects possible multidimensional relationships between these patterns. Furthermore, it does not provide information about the transformations of activity patterns between brain areas and across time. In this project, you would evaluate and advance recently proposed methods to estimate multidimensional brain connectivity using pattern transformations. Methodological challenges are the application of these methods to event-related designs and the limited spatial resolution in the case of EEG and MEG. These methods could be applied to timely questions in cognitive neuroscience using newly acquired datasets or existing open large-scale datasets.