Andreas Daffertshofer, University of Amsterdam, The Netherlands – *Scale-freeness or partial synchronization in neural mass phase oscillator networks: pick one of two?*

Andreas is Principal Investigator at the MOVE Research Institute Amsterdam and Chair in Neural Dynamics, Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam.

His general interest is in the complex dynamics of motor- and cognition-related neural systems and its formal and conceptual assessment in terms of nonlinear dynamics, non-equilibrium statistics, and synergetics. His research activities focused on the spatio-temporal aspects of neural synchronization for information transfer during perceptual-motor tasks. This focus did and still does include several PhD projects involving both experimental approaches and theoretical ideas, also to investigate the interplay of dynamical and stochastic aspects of small-world neural networks. He appropriated various methods for the analysis of multivariate signals for kinematic, electromyographic and encephalographic data. For example, he developed multivariate statistical methods for extracting coherent components in the vicinity of qualitative changes in motor performance yielding a significant reduction of dimension and thus allowing for the analysis of motor (in-)stabilities, in general, and for classifying (switches between) gait patterns, in particular. He also advanced the theory of coordination dynamics by deriving dynamical models for mirror movements, phase transitions in rhythmic movements, accompanying patterns of cortical activity, and locomotion-respiration coupling. Furthermore, he added to several research fields in theoretical physics, ranging from quantum information to diffusive systems and generalized thermostatistics. This analytical work is immediately relevant for the present project in that, e.g., statistical feedback has been shown to optimize stochastically driven population dynamics. At present, he is working on the link between sensorimotor performance and neural synchronization using neuro-physiologically motivated stochastic neural mass models, bifurcation theory, and graph theory. His h-index according to Google Scholar is 40.