PhD position on advanced modelling (AI) of training-induced plasticity

The PhD position is available in the project on "Dynamic modelling of training-induced, response-optimized mobilization of neural resources" of the new CRC for Neural Resources of Cognition (for further details see below). This particular project explores the neuronal mechanisms of training-induced brain plasticity and its role for cognitive enhancement in old age. This includes (1) motor (balance) training in combination with state-of-the-art computational modelling of performance changes (adaptive testing) during behavioral learning; and (2) mapping micro- and macrostructural brain changes using longitudinal multi-parametric MRI (MPM & DWI) in ageing human participants.
The PhD student will join the modelling group at Institute for Cognitive Neurology and Dementia Research (IKND), http://www.iknd.ovgu.de/AG+Dr_+Ziegler.html) and will be jointly supervised by two PI's (Dr. Gabriel Ziegler, IKND and Prof. Marco Taubert, Department of Sport Science, https://www.taubertlab.com) Magdeburg. The PI's research groups provide a fruitful interdisciplinary environment to conduct outstanding research at an international level.

Responsibilities:

- perform and publishing cutting-edge research in the area of quantitative neuroimaging (see Ziegler*/Grabher* et al., *Neurology*, 2018, Ziegler*/Hauser* et al., *Nature Neuroscience*, 2019, Ziegler*/Moutoussis* et al., *HBM*, 2020)
- conceptualization and implementation of a generative statistical modelling framework for brain-behavioral changes during training-induced plasticity (see e.g. Ziegler et al., *NeuroImage,* 2015, 2017, Johnson*/Ziegler* et al., *BiolPsy*, 2020)
- acquisition and analysis of longitudinal MRI and behavioral data in a large sample
- simulating brain plasticity using dynamical systems and non-parametric approaches

Qualifications:

- Master or equivalent in Psychology, Computational Neuroscience, Computer Science, Biomedical Engineering, Statistics, Math/Physics, or related area
- substantial programming expertise (Matlab, or Python/R) is a must
- solid mathematical background (calculus, linear algebra, probability theory)

Highly desired:

- previous experience with neuroimaging data and avid interest in neuroscience
- genuine interest in multivariate and state of the art statistical methods, AI & their underlying math and implementation
- applicants should demonstrate an outstanding academic record including grades/certificates and/or publications
- strong interest in neuroscience topics and/or methods related to this project (brain plasticity, brain imaging, qMRI etc.)
- strong writing, communication, interpersonal and organisational skills

What we offer:

- 45-month PhD student positions in an interdisciplinary and international research environment
- Salary - 65% E13 (TV-L)
- Excellent agile, highly interdisciplinary research environment and computing infrastructure
- Strong dedication to supervision, teaching of state of the art research methods and personal support
- A Reading group on Bayesian methods, machine learning and AI
- Ample opportunities and support for collaboration and networking
- High degree of flexibility

Details on CRC and Embedding in local Scientific Network

The goal of the newly formed Collaborative Research Center for *Neural Resources of Cognition* (SFB 1436 funded by Deutsche Forschungsgemeinschaft) is to identify the physiological limits of cognitive performance and find ways to overcome these limits for healthy (super-)ageing. Thereby, the SFB will facilitate a better understanding of neural circuit-based resource mechanisms and its modulation under pathological ageing and behavioral interventions. SFB's scientists,

post-docs and PhDs will be integrated into the international neuroscience community in Magdeburg. They will work in close collaboration with research groups from the Otto-von-Guericke University, the University Hospital Magdeburg, the German Center for Neurodegenerative Diseases and the Leibniz-Institute for Neurobiology.
A particular strength of this SFB is the cutting-edge research infrastructure including high-resolution human MRI (at 7 Tesla), a super-ageing cohort, a molecular imaging PET-MR system, small-animal MRI, cellular network labelling and electrical, chemo- and optogenetic stimulation techniques.

How to apply?

Application deadline: **19th of March 2021.** The preferred starting date would ideally be May 1st, 2021 or earlier. To apply, please submit a single PDF file containing a full CV (incl. publication if available), personal statement (describing your personal qualifications, research interests and motivation for applying), contact information and academic certificates (Diploma/Master, Bachelor certificates), and a PDF copy of your Diploma/Master thesis. Please send your complete application using the online application portal. For questions, send an e-mail to Dr. Gabriel Ziegler (gabriel.ziegler(at)dzne.de, marco.taubert(at)ovgu.de).

Applications from disabled persons will be given priority in the case of equal suitability, ability and professional expertise. The Otto von Guericke University aims to increase the proportion of women researchers within the university and specifically encourages women to apply. Please note the information for storage of personal data: https://www.uni-magdeburg.de/Datenschutz_Bewerber.html

See also

http://www.iknd.ovgu.de/Jobs/PhD+position+on+advanced+modelling.html