Job announcement

At the Otto-von-Guericke University Magdeburg and the Leibniz-Institut für Neurobiologie Magdeburg, the following positions will be available from January 1st, 2020 or earlier, funded by the federal state of Saxony-Anhalt and the „European Regional Development Fund“ (ERDF 2014-2020), Vorhaben: Center for Behavioral Brain Sciences (CBBS), FKZ: ZS/2016/04/78113 in Magdeburg, Germany.

Interested candidates are encouraged to apply before the **10th of October 2019**.

3 PhD positions

Payment will be according to German E13 TV-L (65 %) for 3 years.

Topic:

The PhD students will be part of a multidisciplinary project that will use a translational approach (tVNS-fMRI /MRI-PET, AG Hämmerer, Betts, Project 1, optogenetic tVNS in mice, AG Prigge, Project 2, tVNS-EEG, AG Zaehle, Project 3,) to explore novel transcutaneous vagus nerve stimulation (tVNS) interventions that take into account inter-individual differences in the integrity of the noradrenergic (NA) system in ageing.

Functional deterioration of the noradrenergic (NA) system, and in particularly the locus coeruleus (LC) in the brainstem, has been shown to occur in ageing and dementia as well as in a variety of clinical and neurological disorders. A recent approach to non-invasive brain stimulation termed transcutaneous vagus nerve stimulation (tVNS), may provide anatomically and temporally more accurate modulation of the LC-NA system compared to current drug interventions. Whilst animal studies have confirmed that the LC-NA is stimulated by VNS, its effectiveness in human clinical trials has been limited. This has been attributed to a) insufficient control of mediating factors such as the current state of the LC-NA system and b) insufficient understanding of how tVNS relates to NA function.

The multidisciplinary project will investigate across four subprojects how inter-individual differences in the 'physiological fitness' of the LC-NA system (LC structure, connectivity, vascularization, receptor/transporter density and cognition) may modulate tVNS effects. Inter-individual effects following tVNS intervention will also be investigated in LC target regions (temporal memory structures and frontal executive control structures) using optogenetic tVNS studies in mice and simultaneous tVNS-EEG, tVNS-fMRI, and MRI-PET in older adults. These measures will be used to collectively determine the efficacy of personalized short, long-term and inhibitory tVNS interventions.

The three PhD candidates will be encouraged to collaborate closely across the 4 projects and have the opportunity to broaden their skillset to include human, animal and clinical neuroscientific methods in this multidisciplinary and translational project. The CBBS (http://www.cbbs.eu/) offers a stimulating, friendly and unique interdisciplinary research environment which brings together neuroscientific research institutions in Magdeburg which are amongst the leaders in their respective fields, focusing on clinical neuroscience (University Hospital Magdeburg, http://www.med.uni-magdeburg.de/en/), dementia research (DZNE, https://www.dzne.de/en/about-us/sites/magdeburg/), and neurobiological research (LIN, https://www.lin-magdeburg.org/).

The ideal candidates will be highly motivated with a strong interest in neuroscience. The PhD student education will be centered within graduation programs of the CBBS (http://www.cbbs.eu/nachwuchsfoerderung/cbbs-graduiertenprogramm) and the LIN (https://www.lin-magdeburg.org/career/information-for-phd-students).

For more details on the 3 specific PhD projects please see below.

PhD Project 1: "Relevance of inter-individual differences in LC-NA system for tVNS effects" (Supervisors Dorothea Hämmerer & Matthew Betts)

The PhD will be associated with the IKND (http://www.iknd.ovgu.de/en/) at the Otto-von-Guericke University of Magdeburg, headed by Prof. Emrah Düzel and located at the DZNE building on the medical campus.

The PhD work is centered around the following methodological approaches:

- characterisation of interindividual differences in the physiological fitness of the LC-NA system in ageing using structural MRI, functional MRI and noradrenaline PET (NAT)
- Assessment of the effectiveness of tVNS interventions in older adults

The requirements for the position are:

- Master in relevant field of study of the life sciences or natural sciences (Neuroscience, Psychology, Biology, Medical engineering, etc.)
- programming skills in MatLab, Python, etc.
- knowledge of relevant statistical analyses and neuroscientific analysis programs such as SPSS, R, SPM, etc.
- ability to work with elderly participants

The Otto-von-Guericke University, Magdeburg is trying to increase the number of women in science. Therefore, women are explicitly encouraged to apply and will be given preference in employment. Handicapped applicants will be preferred when equally experienced.

Please send your application – preferably in electronic format, i.e. a single PDF file – to dorothea.haemmerer@med.ovgu.de or matthew.betts@dzne.de. Applications will be accepted until the position is filled.

PhD Project 2: "Optogenetic stimulation of vagus nerve and cellular consequences within the Locus coeruleus" (Supervisors Matthias Prigge & Matthew Betts)

The PhD work is centered around the following methodological approaches:

- Stereotactic virus injection in the CNS and PNS in mice and implant of optical cannulas and GRIN lenses for mini-endoscopy and multi-wire optrodes
- Optogenetic stimulation of vagus nerve and Locus coeruleus
- Histology and immunostaining of brain slices
- data analysis of fluorescence calcium and extracellular ephys recordings

The requirements for the position are:

- Master in life sciences, but also medical engineering or biophysics

• Experience with rodents

- programming skills in MatLab, Python or R
- most important - curious about science

The Otto-von-Guericke University, Magdeburg is trying to increase the number of women in science. Therefore, women are explicitly encouraged to apply and will be given preference in employment. Handicapped applicants will be preferred when equally experienced.

Please send your application – preferably in electronic format, i.e. as a single PDF file – to prigge@lin-magdeburg.de and matthew.betts@dzne.de . Applications will be accepted until position is filled.

PhD Project 3: "Effects of acute and repetitive tVNS on behavioral and electrophysiological parameters in healthy young participants." (Supervisor Tino Zaehle)

Your obligations in the position would be:

- The task of the PhD student will be to record EEG and behavioral data while participants receive transcutaneous vagus nerve stimulation (tVNS).
- This includes creating the experimental paradigms, conducting combined EEG/tVNS experiments, analyzing the data, and preparing the manuscripts

The requirements for the position are:

- a Master of Science in Psychology or a related discipline (neuroscience, biology, etc.)
- experience in experimental design and research with EEG or MEG as well as behavioral data analysis
- experiences in transcranial brain stimulation (desirable)
- Knowledge in programming with MATLAB (advantageous)

The Otto-von-Guericke University, Magdeburg is trying to increase the number of women in science. Therefore, women are explicitly encouraged to apply and will be given preference in employment. Handicapped applicants will be preferred when equally experienced.

Please send your application – preferably in electronic format, i.e. a single PDF file – to tino.zaehle@ovgu.de. Applications will be accepted until position is filled.