Aarhus University Hospital

## Announcement of PhD-studentship at Department of Neurology
## Aarhus University Hospital, Denmark

| | |
|---|---|
| Studentship title | PhD-scholarship |
| Research area / project title | The effect-mechanism of Deep Brain Stimulation in Parkinson's disease examined by magnetoencephalography (MEG) |
| Location | Danish Centre for Basal Ganglia Research<br>Institute of Clinical Medicine, Aarhus University<br>Department of Neurology, Aarhus University Hospital<br>Aarhus School of Engineering, Aarhus University |
| Recommended background | Master of Science in Electronic Engineering |
| Expected Start Date | August 1, 2013 |
| Duration | 3 years |
| Deadline for application | June 12, 2013 |

The Danish Council for Independent Research (DFF) on Medical Sciences recently awarded the Danish Centre for Basal Ganglia Disease a grant for a three year PhD-scholarship. The proposed project is focused on elucidating the effect-mechanism of deep brain stimulation (DBS) in Parkinson's disease (PD), examined by magnetoencephalography (MEG). A fundamental element of the study will be application of beamforming techniques combined with relevant statistical methods to survey changes in cortical signalling induced by DBS of deeply localised nuclei in the brain.

### Technical background

DBS describes the continuous stimulation of a neural target through implanted electrodes, in PD most often bilateral in the subthalamic nucleus (STN) or internal part of globus pallidus (GPi). The electrodes are connected to the pulse generator implanted subcutaneously on the front of the chest wall. DBS has been used for more than 25 years to treat Movement Disorders such as PD, dystonia and tremor. Since 1996, DBS has been offered patients with advanced PD at Aarhus University Hospital. Both local and international studies have verified the clinical effects of treatment and now, more than 200 patients with Movement Disorders have received this advanced treatment in Aarhus, and more than 80.000 world-wide.

Magnetoencephalography (MEG) is a newly developed neurophysiological tool with the potential to elucidate PD pathophysiology and DBS mechanism. Case studies of patients with STN DBS have shown that DBS in deep brain structures changes the synchrony of cortical neurones, acting through neural networks. Combined MEG of cortical structures and deep brain local field potential (LFP) registration may evolve this understanding further. Recently, Aarhus University Hospital established a MEG laboratory with an Elekta Neuromag Triux MEG-system with the capability of recording magnetic fields in the brain cortical surface.

Aarhus University Hospital

**Candidates for the PhD position**
We are looking for a master of engineering specializing in either one of the fields (or combinations hereof): Electronics, Signal processing, Medical Technology, Health technology. Applicants with skills in signal analysis and an interest in application of mathematical methods in neuroscience will be preferred. The employed PhD candidate will be trained in clinical research methods and become part of an interdisciplinary team focusing on clinical application of basic research methods. Employment conditions (salary etc.) according to applicable collective agreements.

**Application procedure**
To apply, please send a motivated application with a statement of your research interests (max 1½ A4 page), a short CV (max 1 A4 page) and letters of recommendation no later than June 12 at 1 p.m. CET.
The application should be addressed to: Karen Østergaard MD, DMSc, Professor, Consultant Neurologist. Mail the application to: Dept. of Neurology, Aarhus University Hospital, Building 10, Nørrebrogade 44, DK- 8000 Aarhus C, Denmark – or send by e-mail to: kareoest@rm.dk. Include your surname in the subject line of all e-mail correspondence. All files attached must be in pdf-format, and for file naming initially include your surname, i.e. Smith_cv.pdf.

*For further information please contact:*
Erik Johnsen MD, PhD
Dept. of Neurology, Aarhus University Hospital
Nørrebrogade 44, DK-8000 Aarhus C, Denmark
erik.johnsen@ki.au.dk