# MASTER PROJECT

## in Brain-Computer Interface Research

In some neurological diseases patients can sustain in a locked-in state without any remaining muscle activity which could permit them to communicate with their environment. Brain-computer interfaces (BCI) are systems that decode consciously modulated neural activity to generate commands which potentially could help those patients to express their thoughts. The main drawback of most BCI developments is the requirement of gaze shifts and normal vision, a criterion which is not satisfied in locked-in patients. In the master project the student will develop a communication system that permits a brain-controlled communication by means of binary decisions without requirement of eye movements. He or she will use and extend algorithms that were developed in our lab and proved to work reliably in decoding spatial attention shifts. The task of the student is to implement an appropriate closed-loop BCI paradigm and test it with healthy subjects while recording and decoding the electroencephalogram. In subsequent offline analyses he or she will investigate the influence of stimuli features to determine the suitability of the approach for patients with impaired eye movements and eventually having blurred vision.

Requirements:

- Student of relevant area (Integrative Neuroscience, Psychology) or technical area with interest in multidisciplinary work
- good programming skills (preferably Matlab)
- interest in statistical learning, signal processing and neuroscience

Literature recommendation:

Nicolas-Alonso, L.F., Gomez-Gil, J. Brain computer interfaces, a review (2012) Sensors, 12 (2), pp. 1211-1279. DOI: 10.3390/s120201211

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