

Physics Department – Biomedical Engineering

## Evoked Cognitive Control System

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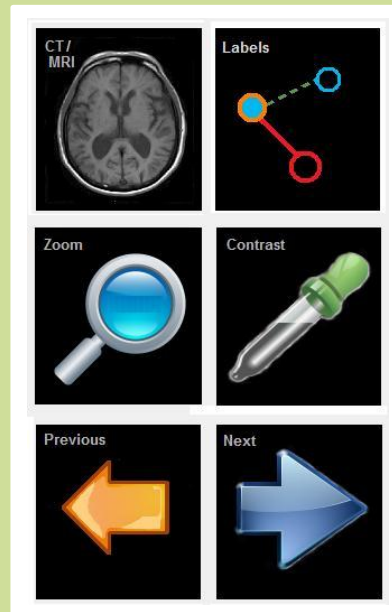
## Objectives

Brain-computer interfaces (BCI) based on electroencephalography (EEG) has been studied in the last years creating increasingly new solutions. In this PhD project, inserted in the area of biomedical engineering, is intended to develop a solution that allows helping a guided surgery system from the brain electrical activity recorded at the scalp of the surgeon: the Evoked Cognitive Control System (ECCS). A BCI based on real-time monitoring of EEG will be created and will enable the identification of relevant patterns and make simple decisions during the surgery.

# ECCS

## Methodology

These standards should be established in advance and associated with actions to be taken. Initially, individuals will be subjected to stimuli that induce a certain response connoted with a specific action. And then the same response should be elicited by employing only the memory of the event. The ECCS should thus be achieved by training the brain and its plasticity. Protocols will be established to evaluate this methodology, ensuring the reliability of the action and the desired response time and guaranteeing that the active control of the equipment is conducted properly.



## Expected Results

With this BCI it will be possible to take actions such as changing images between CT or MRI, make zoom, modify the contrast, move forward / go back and insert labels with information for guided surgery. These procedures allows the surgeon to control a device in a natural way without using his hands. It is also intended that the ECCS will contribute to the creation of innovative solutions in biomedical engineering, economically profitable and with a high degree of robustness and reliability.



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