

## Department of Electrical and Computer Engineering

**Title:** "Mapping Brain Connections in the Human Connectome Project:  
Diffusion and other MRI modalities"

**Stamatios Sotiropoulos**

Research Associate at the Centre for Functional Magnetic Resonance Imaging  
of the Brain (FMRIB), University of Oxford

**Tuesday, 19<sup>th</sup> November 2013, 18:00 – 19:00**  
**Room XΩΔ 02 –B210, New Campus**  
**University of Cyprus**

### **Abstract:**

Scientific research on the human brain has a history of more than 150 years, however many aspects of the brain's structure and function still remain unknown. The Human Connectome Project (HCP) is an ambitious 5-year effort, started in 2010, to map brain connections and their variability in healthy adults. A consortium of HCP investigators studies a population of 1200 subjects (from ~400 families and including twins and their non-twin siblings) using multiple magnetic resonance imaging modalities, along with extensive behavioral and genetic data. In this talk, I will first give an overview of different flavours of in-vivo brain connectivity that can be estimated using diffusion and functional MRI. I will then provide a summary of state-of-the-art advances in data acquisition and processing (focusing more on diffusion MRI) that allow us to obtain very high-quality MRI data, while achieving the aim of scanning a very large number of subjects. The data quality described is representative of the datasets that have been released by the HCP to the community at quarterly intervals, since the beginning of 2013.

### **Biography:**

Stamatis has a background in computer engineering and computational methods. He has experience and a track record of working at the interface between image analysis, statistical inference and MRI physics. His expertise is in biophysical modelling of brain connections at different scales using diffusion MRI, both for resolving tissue microstructural patterns and long-range connections by developing tractography methods. He did his postgraduate studies at the University of Minnesota (MSc) and University of Nottingham (PhD) and since 2010 he has been a Research Associate at the centre for Functional Magnetic Resonance Imaging of the Brain (FMRIB) in University of Oxford. More recently he has been a major contributor to the Human Connectome Project, leading many stages of the diffusion MRI piloting, acquisition and analysis aspects of the project.