

Precongress course: Using Multimodal NeuroImaging to understand Cognitive Cortical Networks.

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Symposium fee (2 sessions): 70 euros

Venue: CaixaForum building

This course provides, for the beginner, a condensed, gentle, overview of NeuroImaging modalities and their use in studying the neural networks underlying cognitive processes. Insight will be provided on basic principles, assumptions, and limitations to help cognitive scientists to optimize the design and analysis of their experiments. One of the objectives is to facilitate the non-specialist's understanding of the techniques that are used in the presentations of ICON.

Part I. Overview of Neuroimaging for Cognitive Neuroscience

The first part of the symposium provides an bird's eye view of the field of Neuroimaging as relevant to cognitive scientists. The different types of imaging modalities and how they are analyzed will be presented and critically compared. These concepts will be integrated by an in-depth illustration of how different neuroimaging techniques applied to single-case neuropsychological studies can help construct or modify models of cognitive processes (face processing). The purpose of this part is to assist the cognitive scientist in choosing the appropriate methods for his work and how to interpret and integrate the information gathered.

Part II. Methods for studying connectivity.

Current tools for identifying connections between neural nodes will be summarized and compared. A review of methods for anatomical, functional and effective connectivity will be given as well as an introduction of network theory applied to brain processes. The purpose of this part is to introduce the cognitive scientist to this new exciting field.

Part II. Practical demonstration. Many of the concepts defined above will be demonstrated with software developed by the Cuban Neuroscience Center and other groups.

Schedule of Events (On Sunday 25 September, 2011 9:00-14:00h.)	
	Part I. Overview of Neuroimaging for Cognitive Neuroscience
9:00 - 9:10 h	Introduction to Neuroimaging: their usefulness for studying neural nodes and circuitry (Maria A. Bobes).
9:10 - 10:30 h	Neuroimaging modalities (Pedro A. Valdés Sosa): <ul style="list-style-type: none"> • Anatomical imaging (Structural and Diffusion Weighted MRI) • Functional Imaging (Electrophysiological Source Imaging and functional Magnetic Resonance Imaging) • Statistical Analysis: Statistical Parametric Mapping and Multi-voxel Pattern Analysis • Multimodal NeuroImage Fusion
10:30 – 11:00 h	Detailed illustration: Dissecting face processing circuitry from NeuroImaging. (Maria A. Bobes).
11:00 - 12:00 h	Break
	Part II. Methods for studying brain connectivity (Pedro A. Valdés Sosa)
12:00 - 13:30 h	<ul style="list-style-type: none"> • Anatomical connectivity: morphometric correlations and tractography • Preprocessing of functional data in the time, frequency and time frequency domain • Independent Component Analysis of functional data • Functional and Effective Connectivity using EEG and fMRI • Network theory
13:30 - 14:00 h	Practical demonstration. María A. Bobes and (Pedro A. Valdés Sosa)