

# LES CONFÉRENCES DE L'ICM



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## Hosted by Paolo BARTOLOMEO

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*Marco CATANI - January 9, 2012 at 11:00*

## Imaging human brain connectivity: the next frontier?

From decades of brain dissections and clinical observations, we have come to believe that cognitive functions are highly localised. MRI scans of the brain have proven particularly useful at identifying the areas in the brain that become activated when people perform certain tasks.

However, what conventional MRI is not good at revealing is the intricate bundle of white matter pathways that connect these areas. These connections are responsible for our most complex cognitive functions and behaviour. Modern neuroscientists are reframing our understanding of brain disorders according to insights coming from the study of the human brain networks.

In my presentation I will show you how the development of a new MRI method, diffusion tensor imaging (DTI) tractography, has shown us in the last ten years the brain in a new light as we haven't seen it before. This method is revealing what is unique to the human brain compared to other species, and why the human brain is so vulnerable to neurological and mental illness.

I will also present recent clinical applications of tractography suggesting that a better knowledge of the anatomy of connections and their heterogeneity in the population could help clinicians to understand protective factors for mental illness and more accurately predict recovery from language impairment and possibly neglect.

But tractography is a fast-paced changing field with rapid advancements in its methodology. Increased resolution and new non-tensorial algorithms are allowing the development of biomarkers of early pathology for disease like Alzheimer's disease, Primary Progressive Aphasia, autism and schizophrenia. I am confident that these new methods will show us exciting and uncharted new horizons in the frontier of human brain connectivity.

**Lundi 9 janvier 2012 à 11h00 / Auditorium de l'ICM  
Hôpital Pitié-Salpêtrière, 47 boulevard de l'hôpital - 75013 Paris**