

[Home](#) > [Research](#) > [Research teams](#)

Team "Brain stimulation and systems neuroscience"

Director: Olivier DAVID

Characterization of large functional brain networks involved in pharmaco-resistant psychiatric and neurological disorders using experimental, clinical and modeling approaches.

The main focus of our team is to understand the common pathophysiological mechanisms between different psychiatric and neurological diseases. For example, they are all characterized by large neuronal network dysfunction, especially within various loops linking cortical to subcortical structures. This may then explain the complexity of the clinical symptoms observed in those diseases due to its impact on multiple cognitive, motor and emotional dimensions.

Research themes and techniques used

In order to characterize the functional and neuroanatomical organization of those large scale networks, establish new brain stimulation strategies and better understand their mechanisms, our team currently develops new research project combining complementary fundamental and clinical approaches:

Deep brain stimulation and sub-cortical networks: characterize common subcortical regions (subthalamic nucleus, anterior thalamic nucleus, locomotor mesencephalic areas) involved in various psychiatric and neurological pathologies (movement disorders, epilepsy, depression, obsessive compulsive disorders);

Cortical and peripheral stimulation: mapping of neuronal circuits using anatomical (tractography) and functional (excitability) based on clinical recordings from epileptic, psychiatric and Crohn patients.

Techniques used

Ex vivo imaging: immunohistochemistry, neuronal track tracing

In vivo neurophysiology: single and multiunit recordings, intracortical and epidural field potentials, electroencephalography (EEG), stereo-electroencephalography (SEEG), magnetoencephalography (MEG), infra-red spectroscopy (NIRS).

Neuroimaging: structural and functional MRI, positron emission tomography (PET), CT scan.

Behavioural studies: cognitive neurosciences, behavioural and clinical phenotype characterisations.

Neurostimulation: deep brain stimulation, direct cortical stimulation, vagus nerve stimulation, transcranial magnetic stimulation (TMS).

Data processing: modeling, signal and image processing.

Publications

Main Publications

Castrioto A, Lhommée E, Moro E, Krack P. *Mood and behavioural effects of subthalamic stimulation in Parkinson's disease*. *Lancet Neurol*. 2014;13(3):287-305

David O, Job AS, De Palma L, Hoffmann D, Minotti L, Kahane P. *Probabilistic functional tractography of the human cortex*. *NeuroImage* 2013;80:307-17

Devergnas A, Piallat B, Prabhu S, Torres N, Louis Benabid A, David O, Chabardès S. *The subcortical hidden side of focal motor seizures: evidence from micro-recordings and local field potentials*. *Brain*. 2012;135(Pt 7):2263-76

David O, Blauwblomme T, Job AS, Chabardès S, Hoffmann D, Minotti L, Kahane P. *Imaging the seizure onset zone with stereo-electroencephalography*. *Brain*. 2011;134(Pt 10):2898-911

Piallat B, Polosan M, Fraix V, Goetz L, David O, Fenoy A, Torres N, Quesada JL, Seigneuret E, Pollak P, Krack P, Bougerol T, Benabid AL, Chabardès S. *Subthalamic neuronal firing in obsessive-compulsive disorder and Parkinson disease*. Ann Neurol. 2011 May;69(5):793-802

Updated on April 24, 2018

Keywords

Cognition, movement disorders, psychiatry, epilepsy, behaviour, functional neurosurgery, neuroanatomy, electrophysiology, neuroimaging, system modeling, deep brain stimulation, transcranial magnetic stimulation, vagus nerve stimulation, EEG.

Team Members

[Leila AYOUBIAN MARKAZI](#)

[Julien BASTIN](#)

[Caroline BENSTAALI](#)

[Mathilde BERTRAND](#)

[Amélie BICHON](#)

[Bruno BONAZ](#)

[Thierry BOUGEROL](#)

[Anthony BOYER](#)

[anna CASTRIOTO](#)

[Romane CECCHI](#)

[Stephan CHABARDES](#)

[BlandineCHANTELOUP-FORÊT](#)

[Eric CHEVRIER](#)

[Véronique COIZET](#)

[Olivier DAVID](#)

[Aurelie DAVIN](#)

[Bettina DEBU](#)

[Valerie FRAIX](#)

[Clarice FROGET](#)

[Eloise GRONLIER](#)

[Jessy HUGUES DIT CILES](#)

[Chloé JAROSZYNSKI](#)

[Maciej JEDYNAK](#)

[Andréa KISTNER](#)

[Maeva LAQUITAINE](#)

[Jean-Didier LEMARECHAL](#)

[Eugénie LHOMMEE](#)

[Elena MORO](#)

[Antoine PACCARD](#)

[Brice PASSERA](#)

[Arnaud PAUTRAT](#)

[Pierre PELISSIER](#)

[Brigitte PIALLAT](#)

[Mircea POLOSAN](#)

[Elie PONCET](#)

[Carole SAUBAT](#)

[Emmanuelle SCHMITT](#)

[Valérie SINNIGER](#)

[Raouf ZOUGLECH](#)