



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2023-2024

(internship from January to June 2024)

Host laboratory: Lyon Neuroscience Research Center - INSERM U1028, CNRS UMR5292, 16, av du Doyen Lépine, 69500 Bron

Host team: Impact Team, <https://www.crnl.fr/fr/equipe/impact>

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Project title : Anatomico-functional organization of the Postero-Medial Cortex in humans

Project summary :

Self (*versus* others)-referencing operations are fundamental to any process that we intend, be it physical (e.g., grasping an object, walking through a crowded environment) or psychological (e.g., first- or other-persons perspectives). It emerges from interoceptive experiences and is social in essence as it develops through learning and social interactions. Unrevealing its neural basis - that remains largely misunderstood to date - is essential to understand how we seemingly and often effortlessly interact with our social environment. Among the fronto-parietal cortical brain regions thought to be involved in self (*versus* others)-referencing processing, the postero-medial cortex (PMC), comprising in particular the precuneus and the posterior cingulate cortex, has received far less attention. One important caveat is the lack of a clear anatomico-functional description of this region, despite its known vulnerability in various neurological disease, including schizophrenia, depression, autism spectrum disorder or Alzheimer's Disease. The goal of the project will be to provide a description of the anatomico-functional organization of PMC using neuroimaging data that have already been acquired in neurotypical humans. We will use complementary methods: 1) a data driven approach by parcellating the PMC based on whole-brain functional connectivity, and 2) a seed-based approach based on sulci localization. The comparison between the different profiles of connectivity within PMC will permit a consensual understanding on its fine-grained anatomico-functional organization. Finally, this project will also complement ongoing investigations in the laboratory on the functional organization of PMC in macaques to evaluate its importance in primate brain evolution.

3-5 recent publications :

- Bogdanova OV, Bogdanov VB, Miller LE, Hadj-Bouziane F (2022). Simulated proximity enhances perceptual and physiological responses to emotional facial expressions. *Sci Rep.* 12(1):109. doi: 10.1038/s41598-021-03587-z
- Giacometti C, Dureux A, Autran-Clavagnier D, Wilson CRE, Sallet J, Dirheimer M, Procyk E, Hadj-Bouziane F, Amiez C (2022) Frontal cortical functional connectivity is impacted by anaesthesia in macaques. *Cereb Cortex.* 32(18):4050-4067. doi: 10.1093/cercor/bhab465.
- Bogdanova OV, Bogdanov VB, Dureux A, Farnè A, Hadj-Bouziane F (2021) The Peripersonal Space in a social world. *Cortex.* 142:28-46. doi: 10.1016/j.cortex.2021.05.005.
- Hadj-Bouziane F, Liu N, Bell AH, Gothard KM, Luh WM, Tootell RB, Murray EA, Ungerleider LG (2012) Amygdala lesions disrupt modulation of functional MRI activity evoked by facial expression in the monkey inferior temporal cortex. *Proc Natl Acad Sci U S A.* 109(52):E3640-8. doi: 10.1073/pnas.1218406109.