

MASTER 2 Neurosciences Fondamentales et Cliniques
UCB Lyon 1, Lyon, France

Internship proposal 2020-2021
(internship from January to end of May 2021)

Host laboratories:

Centre de Recherche en Neurosciences de Lyon (CRNL)

Centre de Recherche en Acquisition et Traitement de l'Image pour la Santé (CREATIS)

Host teams:

CRNL: BIORAN (located at CERMEP imaging platform, hospital site)

<https://crnl.univ-lyon1.fr/index.php/en/Research/CRNL-teams-2016-2020/14>

CREATIS: NMR and OPTICS (located at La Doua, university site)

[https://www.creatis.insa-lyon.fr/site7/en/MRI Optics Methods Systems](https://www.creatis.insa-lyon.fr/site7/en/MRI%20Optics%20Methods%20Systems)

Internship supervisors:

CRNL: Fabien Chauveau, CNRS, chauveau@cermep.fr

CREATIS: Hélène Ratiney, CNRS, helene.ratiney@creatis.insa-lyon.fr

Françoise Durand-Dubief, HCL, francoise.durand-dubief@chu-lyon.fr

Project title: High-field MRI follow-up of demyelination and remyelination

Project summary:

Multiple sclerosis is a chronic disease of the CNS, which associates inflammatory and neurodegenerative processes. Recurrent episodes of demyelination result in neuro-axonal degeneration. Conventional MRI measurements (lesion burden, location, and type) correlate poorly with disability and lack long-term prognostic value. Many advanced MRI approaches have been developed but none of them is specific enough and available in clinical practice. The purpose of this internship is to determine the longitudinal changes in demyelinating lesions over a long-term follow up in a rat model [1] explored at 11.7T with MR imaging and spectroscopy. Novel MRI/MRS sequences [2-3], based on original magnetization preparation, will be employed to image and characterize targeted short T2 components of the myelin. MRI/MRS patterns of lesions will be compared to 3D-reconstructed histological volumes.

Recent publications:

[1] Zhang M, et al. (2019) Evaluation of Myelin Radiotracers in the Lysolecithin Rat Model of Focal Demyelination: Beware of Pitfalls! Contrast Media Mol Imaging, 2019, 9294586.

[2] Van Reeth E, et al. (2019) A simplified framework to optimize MRI contrast preparation. Magnetic Resonance in Medicine, 81(1), 424-438.

[3] Koob M, et al. (2016) Creatine, glutamine plus glutamate, and macromolecules are decreased in the central white matter of premature neonates around term. PloS ONE, 11(8), e0160990.

Please send your proposal to emiliano.macaluso@univ-lyon1.fr and marion.richard@univ-lyon1.fr for publication on the website.