Development of MRI methods applied to Neuroscience

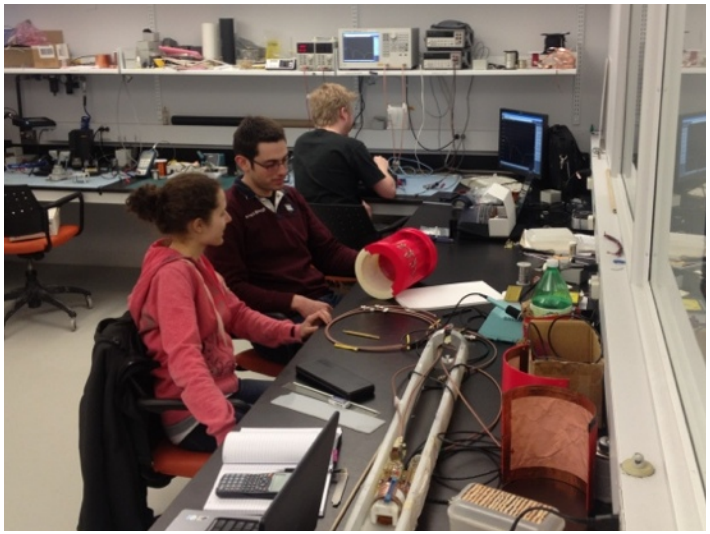
- MRI in neuroscience
  - Important applications (Multiple sclerosis, Alzheimer, etc.)
  - Need biomarker to validate new treatments
  - Challenges of MRI (hardware, acquisition, image processing)
  - Highly multidisciplinary field
- Our approach : To develop a **global** expertise

Hardware → Acquisitions → Analyses → Applications

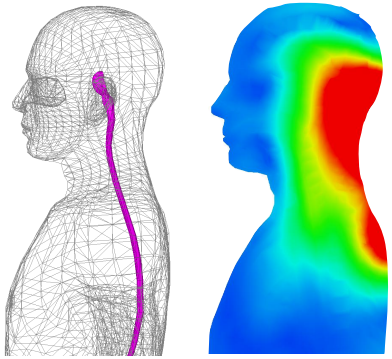
Development of MRI methods applied to Neuroscience

Hardware

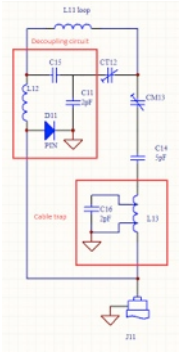
MRI coil Lab



Electromagnetic simulations



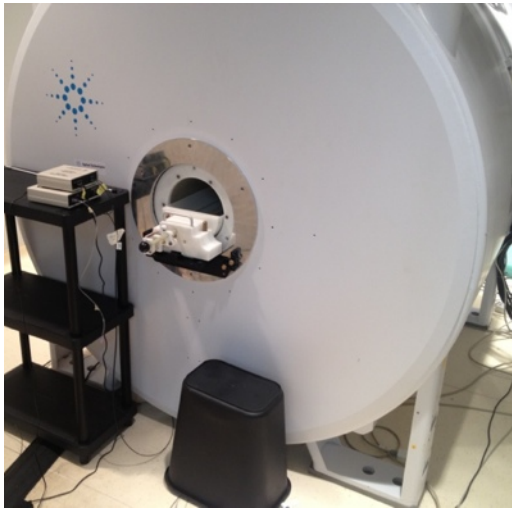
Building coils



Development of MRI methods applied to Neuroscience

Hardware → Acquisitions

7 tesla (animal)



INSTITUT DE CARDIOLOGIE DE MONTRÉAL

3 tesla (human)

Centre de recherche iugm Institut universitaire de gériatrie de Montréal

- Optimization of pulse sequences
- Anatomical and Functional Imaging
- Developing advanced techniques to reduce artifacts (motion, etc.)
- *In vivo* histology

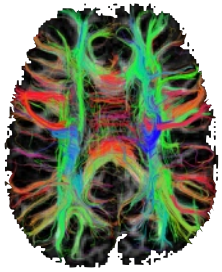
Development of MRI methods applied to Neuroscience

Hardware → Acquisitions → Processing

Image Processing Lab

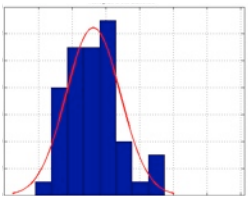
Segmentation

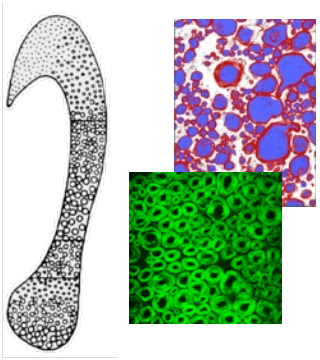
Tractography



Functional MRI

Biophysical modelling



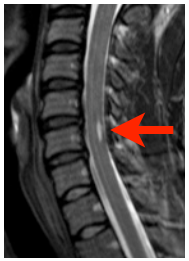


Development of MRI methods applied to Neuroscience

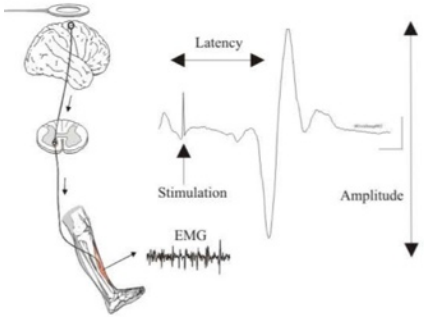
Hardware → Acquisitions → Processing → **Applications**

Spinal Cord Injury

Neurological diseases



Electrophysiology



Multiple sclerosis