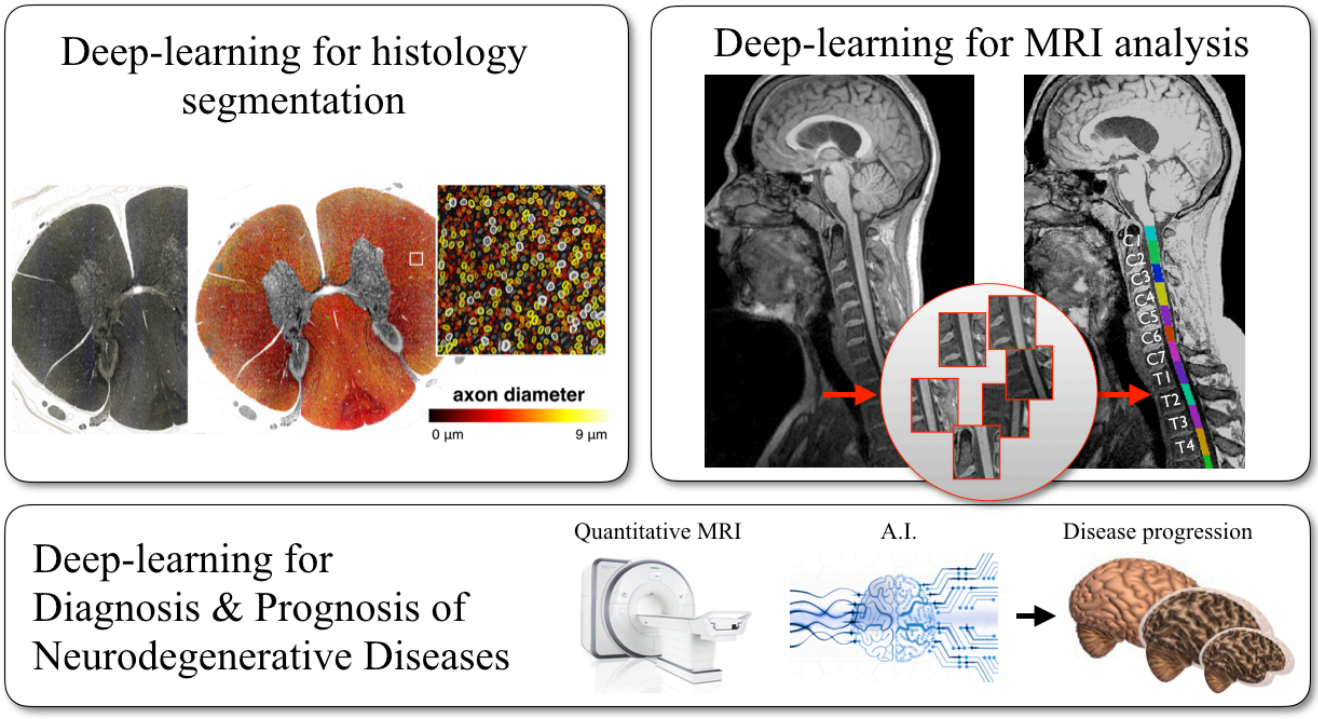
Available positions:
Deep Learning applied to Medical Imaging

At the **NeuroPoly** lab at Polytechnique & Université de Montréal (www.neuro.polymtl.ca), we develop advanced MRI image analysis techniques using deep learning, validate them using large-scale histology, distribute them as open-source software[1] and, in collaboration with international neurologists and radiologists, apply these tools in patients with spinal cord injury and neurodegenerative diseases (multiple sclerosis, ALS, etc.).

We are recruiting Master's PhD and Postdoc fellows with strong skills in computer science, deep learning and image analysis for the following applications:



Interested? Send a CV + three references to Prof. Julien Cohen-Adad: jcohen@polymtl.ca.

[1] https://github.com/neuropoly

List of potential projects

- **Multiple sclerosis (MS) lesion segmentation**
  Goal: Segment MS lesions in order to help classify these patients (phenotype, personalized therapy). Dataset: MRIs of ~650 patients from 12 international clinical centers, MS lesions labeled by four neuroradiologists.
- **Predicting outcome in spinal cord compression**
  Goal: Predict the outcome of these patients and help decide whether to operate or not. Collaboration with neurosurgeons at Toronto Western Hospital / University of Toronto. Dataset: MRIs of ~450 patients with cervical spinal cord compression (two contrasts: T1w and T2w) from the AOTrauma North America Foundation cervical myelopathy database.
- **Vertebral Labeling from a large variety of MRI scans**
  Goal: Label intervertebral discs (C1, C2, etc.) from a large variety of MRI data. One application, in relation to the spinal cord compression project, would be to inform on the vertebral level of compression, which has important prognosis information. Dataset: 2,500 MRIs with multiple contrasts (T1, T2, T2*), orientation and resolution, with manual labeling of discs.
- **Segmentation of axons and myelin from histology**
  Goal: Segment axons and myelin sheath (two different labels) from large-scale histology data, in order to create microstructure atlas of the human central nervous system (example: see BigBrain project: https://bigbrain.loris.ca). Dataset: Electron microscopy and optical imaging, with about 15,000 axons and myelin sheath manually segmented.