Open Postdoctoral Fellow Positions: Machine Learning for Medical Image Analysis

Position and supervision
We are seeking applicants for two Postdoctoral Fellow positions in Machine Learning for Medical Image Analysis, under the joint supervision of Profs. Tal Arbel and Doina Precup. Prof. Arbel is the Director of the Medical Imaging Lab and Probabilistic Vision Group at the Centre for Intelligent Machines, a vibrant research team focusing on developing new probabilistic models and machine learning algorithms for computer vision and medical image analysis. She is a Canada CIFAR AI Chair at MILA and an associate member of the Goodman Cancer Research Center. Prof. Precup is the co-director of the Reasoning and Learning Lab, a group of 50+ researchers interested in machine learning and AI. She is a Canada CIFAR AI Chair at MILA and a Research Team Leader at DeepMind.

Research Project and Team
The postdoctoral fellow will focus on the development of new deep learning models for medical image analysis in the context of neurological diseases such as Multiple Sclerosis (MS) as well as cancers, assisting the team in attaining the long-term objective of new personalized treatments strategies based on medical images. This includes models to: (a) predict future new imaging activity (e.g. lesions) in MRI and disease progression (e.g. disability), (b) identify potential responders to treatments, and (c) identify disease sub-types. Meeting these objectives will require addressing open research problems, including (a) modelling the spatiotemporal evolution of disease through sequentially acquired medical images (with additional clinical information), (b) conveying uncertainties, and (c) addressing interpretability in deep learning models. To tackle these problems, the postdoctoral fellow will explore modern machine learning topics such as probabilistic knowledge distillation, self-supervised learning, temporal generative models, domain adaptation, multi-modal learning, and Bayesian deep learning.

Due to the interdisciplinary nature of the research, the postdoctoral fellow will benefit from ongoing collaborations with researchers and clinicians at the Montreal Neurological Institute and the Goodman Cancer Research Centre at McGill, computer vision and machine learning researchers at McGill, MILA, and Oxford (e.g. Yarin Gal), with ongoing collaborations with industrial partners (e.g. NeuroRx Research). Furthermore, the postdoctoral fellow will join a large collaborative team of researchers worldwide as part of a grant funded by the International Progressive MS Alliance (IPMSA), giving them unique access to the largest, proprietary dataset of MS patient images acquired worldwide (i.e. up to 40,000 scans) during multi-center clinical trials along with manual lesion labels, treatment codes and progression outcomes.

In addition to conducting independent research and collaborating with other research teams, the postdoctoral fellow will aid in the mentoring and supervision of graduate students.

Qualifications
Candidates must have a PhD in machine learning, with some experience in applications in computer vision or medical image analysis, and a good track record of publishing in top conferences and journals (e.g. ICML, NeurIPS, CVPR, MICCAI). Candidates must also have strong mathematical skills, good programming skills and knowledge, and experience in the domain of machine learning (e.g. Python, OpenCV, PyTorch).

How to Apply
Candidates should submit a CV, a summary of scientific research areas, 1-2 significant publications, and the names of 2 reference letter writers. Postdoctoral fellowships can commence right away, and the
duration is two years with the possibility of an extension. All interested candidates should contact Prof. Tal Arbel (arbel@cim.mcgill.ca).