



Biomedical Informatics Grand Rounds



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Building atlases of the human brain with histology, Bayesian modeling and deep learning; and their application to segmentation of in vivo MRI

Wednesday, Dec 9, 2020 3 pm - 4 pm

Abstract: Widespread neuroimaging packages like FreeSurfer, FSL or SPM enable morphometric, functional, and connectivity studies of the human brain in vivo using MRI. While these packages are frequently updated to stay near the state of the art in terms of methodology, they still rely on computational atlases which are over a decade old using in vivo MRI scans, and which fail to describe the human brain beyond the whole structure level. In this talk, I will present ongoing work to build a computational atlas of the whole human brain at the substructure level, which we intend to integrate with FreeSurfer. Specifically, I will present work on Bayesian atlas building with ex vivo data; 3D reconstruction of histology with Bayesian and deep learning methods; and sequence-independent segmentation of in vivo brain MRI with a combination of deep learning and Bayesian inference.

Bio: Juan Eugenio Iglesias holds M.Sc. degrees in Telecom and Electrical Engineering from the University of Seville (Spain) and the Royal Institute of Technology (KTH, Stockholm, Sweden), respectively. He did a Ph.D. in Biomedical Engineering at UCLA sponsored by a Fulbright grant. He now holds appointments at University College London (UK) and the Martinos Center for Biomedical Imaging (Massachusetts General Hospital & Harvard Medical School). His main research interest, which is funded by the European Research Council, is the construction of computational atlases of the human brain using ex vivo samples, as well as their application to automated segmentation of in vivo brain MRI.

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