

Cognition Colloquium

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Characterizing brain microstructure using magnetic resonance imaging: Towards in-vivo histology

Understanding the normal and diseased human brain crucially depends on reliable knowledge of its microstructure. Until recently, the microstructure could only reliably be determined using invasive methods such as ex-vivo histology. I will discuss how an interdisciplinary approach developing novel magnetic resonance imaging (MRI) acquisition methods, image processing methods and integrated biophysical models aims to establish non-invasive quantitative histological measures of brain tissue. Example applications of this emerging field of in-vivo histology includes the mapping of cortical myelination, superficial white matter / U-fibers and iron in the substantia nigra. I will also address major challenges to this ambitious goal including the validation of the in-vivo histology approaches.



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