Increasing the spatial specificity of neuroimaging biomarkers: new approaches to structural, functional and diffusion MRI analysis.

Abstract:
Our group has been developing image analysis techniques that, rather than relying on whole-brain statistical mapping, focus on specific anatomical structures of interest. These structure-specific approaches enable us to introduce additional domain knowledge into the analysis, as well as use more structure-specific ways of normalizing data across subjects. Some of our most exciting work involves developing more detailed hippocampal biomarkers for disease progression in neurodegenerative disorders. I will discuss our recent results on automatic segmentation of hippocampal subfields, automatic estimation of hippocampal atrophy at the subfield level, as well as ongoing work on using postmortem 3D hippocampal atlases to inform analysis of in vivo MRI. I will also touch on our related work on hippocampus-focused functional MRI analysis and tract-specific analysis of diffusion MRI.