Abstract:

Essential Tremor (ET) is one of the most common movement disorders. It is characterized by a kinetic tremor in the upper extremities. It is known to be a cerebellar disorder in nature, but the extent of the disease effect throughout the brain is still actively studied. Additionally, it can be challenging to differentiate between ET and Parkinson’s disease (PD) in the clinic due to similar and often overlapping symptoms with disease progression. Therefore, it is of interest to investigate magnetic resonance imaging (MRI) biomarkers to investigate the extent of neurodegeneration in ET, as well as identify differences in disease pathology between ET and PD. This thesis addresses these questions with three aims. First, the extent of neurodegeneration beyond the cerebellum, represented by gray matter volume loss, will be assessed using high resolution T1-weighted images and voxel based morphometry. Second, changes in thalamic metabolism between ET and PD cases will be assessed using gamma-aminobutyric acid (GABA) edited magnetic resonance spectroscopy (MRS). Third, differences in brain iron accumulation between ET and PD will be measured using T2* mapping to determine relative iron concentration in the substantia nigra and globus pallidus. As a whole, this thesis provides additional proof of neurodegeneration in ET as well as potential biomarkers for clinical differentiation of ET and PD.