

# **A framework for the study of the significance of differences in PET images: An objective method for quantifying functional change**

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The purpose of the work described in this thesis is to provide a method for analyzing the change in metabolism of labeled dihydroxyphenylalanine (DOPA) analogs induced by disease and pharmacological intervention in anatomically equivalent regions across a sample population. Quantifying these changes and their statistical significance required investigation and innovation of methods in tomographic image reconstruction, computation of variance and covariance in tomographic images, image coregistration, and antialiased image resampling. A generalized framework is described which utilizes these methods. The software implementation of the methods has been made available via anonymous FTP at "petrix.medphysics.wisc.edu".