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# **Ph.D. Thesis Abstract for Kathryn McMillan**

Department of Medical Physics  
University of Wisconsin - School of Medicine and Public Health  
Madison, Wisconsin

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## **fMRI in Neuroimaging: Application in Tumor Physiology & Working Memory**

**Kathryn McMillan**

Under the supervision of Professor M. Elizabeth Meyerand  
At the University of Wisconsin-Madison  
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Functional magnetic resonance imaging (fMRI) spans applications from describing task-related brain mapping applications to the vast study of brain physiology in normal and multiple disease states. My thesis work focuses on a consistent methodology between two disparate projects. When dealing with large amounts of data, regardless of whether sorting through various parameter maps (spectroscopy, diffusion, perfusion, and hypoxia) in cancer processes, or 24 past fMRI papers containing coordinates of n-back working memory studies, concordant areas of interest. This appears to be a powerful tool as I present overlap maps as a novel technique when considering a large number of physiologic scans in cancer. In addition, meta-analysis using Activation Likelihood Estimation (ALE) techniques offers a map of consistently-activated areas across studies. These concordant maps, both overlap and ALE, can offer insight when applying new techniques in various areas of brain imaging research.

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