

**Department of Biomedical Engineering  
COLLEGES OF ENGINEERING AND MEDICINE**

**SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: March 2, 2009**

*The Department of Biomedical Engineering is pleased to offer the following research project for the summer of 2009. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.*

**Functional MRI in Parkinson's Disease**

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**Project Description**

Our laboratory, the Center for Imaging Research (CIR), is focused on the development of magnetic resonance imaging (MRI and spectroscopy (MRS) methodologies and the utilization of these methodologies for noninvasive studies involving metabolism, bioenergetics and function of the human brain and other organs. The CIR has all of the necessary major research instrumentation, computational facilities, and file system storage resources to conduct the proposed neuroimaging research. This facility includes the physical hardware, software, and personnel to permit the large-scale acquisition, analysis, and secure storage of neuroimaging data, clinical measures, and database management proposed in this project. The centerpiece of the CIR is a 4.0 Tesla Varian INOVA whole-body MR imager and spectrometer system that is dedicated solely to research.

The specific goal of this research project is to utilize a delayed visual-cued finger movement task and functional MRI to investigate the underlying mechanism of motor preparation deficit in patients with Parkinson's disease (PD). The specific assignments that the student will be involved in include but are not limited to:

1. Developing a delayed visual-cued finger movement paradigm that includes the components of movement preparation and execution as well as working memory.
2. Analyzing fMRI data obtained from patients with PD and comparing these with that obtained from aged- and gender-matched healthy volunteers in a statistical manner.

Should a WISE student pick this project, she would work with a diverse team of MR physicists, neuroscientists, neurologists, and biomedical engineers to conduct these studies in our laboratory. This student will learn functional MRI data acquisition and analysis techniques that are commonly used in neuroscience research.