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### **Research Area: Computational Sciences and Engineering**

ORNL is developing advanced brain-wave analysis for early diagnosis of Alzheimer's disease (AD). AD is a progressive disease that destroys brain cells, usually beginning with short-memory loss and behavioral problems. The ORNL work is in collaboration with Dr. Rod Shankle, MD (University of California, Irvine) and Dr. Robert Sneddon who are developing a method for measuring variability in EEG data during specific psychophysical tasks. The goal is improvement in distinguishing various disease states: normal aging, mild cognitive impairment, and mild dementia due to AD. The student will be designing and implementing a Java program that will apply Dr. Shankle's methodology to data from another collaborator, Dr. Yang Jiang (University of Kentucky School of Medicine). The Java program will analyze these data for the ratio of variance of anterior cortical activity to the variance of posterior cortical activity. This measure will be used to identify the optimal cutoff value to discriminate normal from impaired subjects, and thus improve the accuracy for discriminating among disease states.

#### **Research Mentors:**

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