Holly Kristin Williams
The University of Alabama at Birmingham
Major: Computer and Information Sciences

Program: Research Alliance in Math and Science

Email: hlly.williams@yahoo.com
Work: williamshk@ornl.gov

Research Area: Center for Engineering Science Advanced Research

Fast Fourier Transform is an algorithm that is very important in many different scientific areas. It is used in many fields such as image processing, fluid dynamics, and quantum physics, and improving its performance has been an important research task in the fields of applied mathematics, signal processing, and computer science. The goal of this research project is to analyze the performance of parallelization of Fast Fourier Transform algorithms. This research will investigate and understand the different algorithms for parallelizing the Fast Fourier Transform, and it will describe the performance of the algorithms on different computing platforms. The performance will be investigated first on the CPU to determine the effects of parallelizing it using the SIMD paradigm on multiple cores. The algorithm will also be run on the GPU to determine the performance when using the SIMT architecture on many threads. The performance of the algorithm will be determined through examining several different properties such as execution time, communicational latency, and power dissipation.

Research Mentor:

Jacob Barhen
Center for Engineering Science Advanced Research
Computing and Computational Science Directorate
Oak Ridge National Laboratory
865-574-7131
barhenj@ornl.gov