

**Department of Physics  
COLLEGE OF ARTS & SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: March 1, 2012**

*The Department of Physics is pleased to offer the following research project for the summer of 2012. 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.*

**Project Title: Highly Parallel Computing with a GPU (Graphics Processing Unit)\***

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**Project Description**

The student will develop highly parallel algorithms for use on a GPU (graphics processing unit) related to applications of interest in particle physics. We currently anticipate two possibilities:

1. The first would be adapting existing image processing algorithms to reconstruction of clusters in an electromagnetic calorimeter.
2. The second would be adapting neural network and/or bagger decision tree learning algorithms for execution on a GPU.

The student should have taken the General Physics sequence, but need not be a physics major or have any special interest in physics. More importantly, the student should be comfortable programming in C++. If possible, the student should take or audit the GPU programming course our post-doc will be offering in the spring quarter, probably at 11 AM on Tuesdays and Thursdays.

Students interested in this project should contact Professor Mike Sokoloff ([mike.sokoloff@uc.edu](mailto:mike.sokoloff@uc.edu)).

\* In the 1999-2000 timeframe, computer scientists, along with researchers in fields such as medical imaging and electromagnetics, started using GPUs for running general purpose computational applications. They found that the excellent floating point performance in GPUs led to a huge performance boost for a range of scientific applications.