Introduction
There has been a push for parallelization in recent scientific computation. This has been the logical step forward, as it becomes more difficult to use additional units of computation per dollar with the cessation of Moore’s law. Much of this parallelization, however, has been homogeneous, running on machines with many of the same processor. This is not necessarily the most efficient method. Not all processors share the same strengths, some being better at certain tasks than are others. It has been stated that the future of processing is heterogeneity. Not all processors share the same strengths, some being better at certain tasks than are others. It has been stated that the future of processing is heterogeneity.

Materials and methods
We implemented our GPGPU program using the CUDA architecture and programming model. Our GPGPU hardware was provided by the Spider cluster on LONI. The Spider cluster makes use of Nvidia T10 graphics processing, The Queenbee cluster, on which we ran the existing MPI code, was composed of Intel Xeon 5430 processors. The work to be sped up was on simulating electron excitation of that accomplished by any one of the CPUs. The fact that one graphics card is doing four times the work becomes more of a presence in the superscromping scene.

Results
After much studying of the CUDA documentation and the existing MPI code, we began to write evolving prototypes of the code to run on the Spider cluster of GPGPUs. After much benchmarking, we received results for a series of data points.

One result which must not be ignored is that of cost. We examined the cost of the physical hardware on which we were running our GPGPU implementation, versus their MPI implementation and noticed another advantage.

This fiscal advantage to using the graphics processor becomes even more self-evident when we conceptualize it a different way. The following visualization of bang per buck presents a startling increase in value of the graphics card.

Conclusions
From our results it is not difficult to conclude that there is a tremendous future for scientific computation in heterogeneous processing. Our experiments in general purpose graphics processing have yielded strong results in favor of additional inquiry. This field is the bleeding edge and, as such, must be approached with a grain of salt. We made use of CUDA because of its efficiency and previous establishment. Future work into the possibilities of the more universal OpenCL might be beneficial.

In heterogeneous computing, much attention must be paid to the architecture of the processor on which work is being done. This is an art form familiar to earlier generations of computer programmers. Earlier programming necessitated a more architecture based form of programming.

Work such as ours, is a precursor to the future of heterogeneous computing. It is possible that, in the near future, dedicated hardware will become more of a presence in the supercomputing scene.

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