

# CS554 Project Ideas

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## OS:Power – Understanding power management and its impact in modern Intel Haswell Processors

### Overview

This project aims to understand power management options and their impact in modern Intel Haswell Processors. The latest iteration of Intel Haswell processors have an abundance of cores, 18 cores, which can each be independently managed in terms of frequency scaling, in order to control the power consumption. Understanding how this large degree of fine control impacts real applications is important towards building automated algorithms for power management that can maintain certain performance guarantees.

For this project you will explore how core throttling or boosting impacts real application (ADCIRC, NAMD, and Linpack/HPCC) performance. One outcome of this work should be a framework that implements automated algorithms to throttle or boost cores in order to hit certain performance targets, power consumption targets, or both.

### Relevant Systems and Reading Material

- Intel Xeon E5-2699 v3 - [http://ark.intel.com/products/81061/Intel-Xeon-Processor-E5-2699-v3-45M-Cache-2\\_30-GHz](http://ark.intel.com/products/81061/Intel-Xeon-Processor-E5-2699-v3-45M-Cache-2_30-GHz)
- ADCIRC - <http://adcirc.org/>
- NAMD - <http://www.ks.uiuc.edu/Research/namd/>
- Linpack/HPCC - <http://icl.cs.utk.edu/hpcc/>

### Preferred/Required Skills

- Required: scripting languages
- Preferred: C/C++, low level OS tuning parameters

### Evaluation

You will be responsible for evaluating your power management framework and how it impacts ADCIRC, NAMD, and Linpack/HPCC. Experiments will be done on an 8-node cluster at Argonne that are equipped with these latest E5-2699 v3 CPUs, for a total of 288 cores.

### Project Mentor

Ioan Raicu, [iraicu@cs.iit.edu](mailto:iraicu@cs.iit.edu)