

Submission to EduPar 18 Poster

Course Design, Lectures and Sample Problems for the Intel Xeon Phi Karen L. Karavanic, Portland State University

In this poster I detail and discuss my initial efforts to develop courseware for the Intel Xeon Phi manycore architecture. First I will provide an overview of the course goals, important topics, and opportunities for integration of core PDC topics. I will detail early results from two offerings of the course “Accelerated Computing with GPUs and Intel Xeon Phi” at Portland State University. The materials were used as part of a mixed undergraduate/graduate elective course in Winter and Spring 2017. The first half of the course provides an overview of the GPU architecture and includes hands-on programming with CUDA.

To program the Xeon Phi we taught OpenMP, and we discuss the particular aspects we found essential. Although OpenMP is not new to the classroom, and a number of books and online materials exist, we found there was still a gap that needed to be filled. Specifically, materials geared to understanding the unique aspects of the architecture, and understanding vector instructions. For these we developed lectures, exercises and homework problems. In addition, we tested the classroom use of software development tools to measure and visualize the OpenMP codes as they ran. One particular focus is the relationship of performance to the architecture features for both Xeon Phi and for the GPU. We found most existing documentation for the Xeon Phi to be targeted to the professional audience and ill-suited for the undergraduate CS classroom.

Our work continues. We are offering the course in Spring 2018 and will conduct a set of surveys as part of this offering designed to gain further insight into our newly developed materials. We will also test out some refined versions of the initial exercises, and introduce some new practice exercises.

Travel Budget: I am requesting travel funds to attend EduPar 18 and IPDPS in Vancouver Canada. This cost is estimated as follows:

Roundtrip airfare Portland OR: \$300

IPDPS Early Registration Fee: \$650

Hotel approx.. \$245/night for 3 nights

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