Numerical Computations with GPUs

V. Kindratenko (*Editor*), National Center for Supercomputing Applications (NCSA),
University of Illinois at Urbana-Champaign, Illinois, USA

BACKGROUND INFORMATION

Numerical Computations with GPUs, to be published by Springer, will contain a collection of articles on core numerical methods adapted for Graphics Processing Units (GPUs). Classical numerical methods (solution of linear equations, FFT, etc.) are central in many scientific and engineering computations. In recent years, substantial efforts were undertaken to adapt these methods for recently emerged GPU-based systems. The book is envisioned as a consolidation of such work into a single volume covering widely used methods and techniques. Each chapter will provide mathematical background, parallel algorithm and implementation details leading to reusable, adaptable, and scalable code fragments. Each chapter will be accompanied with a basic CUDA or OpenCL source code that can be used by the readers as a starting point for adaptation in their applications. The book will serve as a GPU implementation manual for many numerical algorithms providing valuable insights into parallelization strategies for GPUs as well as ready-to-use code fragments with a broad appeal to both developers and researchers interested in GPU computing.

CALL FOR CONTRIBUTIONS

Researchers working on the development and implementation of numerical methods on GPUs are invited to submit their work for consideration for inclusion in the book. Articles on the following broad topics are solicited:

- Dense linear algebra
- Sparse linear algebra
- Eigenvalues and eigenvectors
- Numerical integration and differentiation
- Interpolation and extrapolation
- Random number generation and Monte Carlo problems
- FFT and its applications
- Functions and root finding
- Data fitting
- Iterative solvers
- Differential equations
- Sorting and searching
- Coding and compression

TIMELINE

Authors interested in contributing to this volume are asked to submit a short proposal via EasyChair by October 15, 2013. Authors of the accepted/invited chapters are expected to write and submit to the editor completed chapters by January 31, 2014.

PROPOSAL

- Due date: October 15th

- What to submit
    - Author(s) name, address, affiliation, email
    - The proposed chapter title
    - Chapter outline and brief (<1000 words) description of the numerical method to be implemented, the algorithm, and its CUDA and/or OpenCL implementation, and the description of the source code to be supplied.
    - Estimated number of pages/words/figures/source code size.
- How to submit
    - Via EasyChair to https://www.easychair.org/conferences/?conf=ncgpu14.
        - Use "Abstract" field for the brief description of the method, etc.
        - Use "Keywords" field for estimated number of pages, etc.
        - Feel free to attach any additional papers as a single PDF or Word file, such as journal/conference papers, that may be useful in evaluating the chapter proposal.
- What to expect
    - Submissions will be reviewed for compliance with the subject and scope of the book.
    - Authors will be notified by late October if their book chapter proposals are acceptable for inclusion in the book.

CHAPTER PREPARATION

Authors of the accepted/invited chapters are expected to write and submit to the editor completed chapters by January 31st, 2014.

The submissions will be reviewed for completeness and quality and the final revisions are due to the publisher (Springer) by March 1st, 2014.

PRODUCTION

Authors are expected to work with the publisher production team to finalize the publication in Q2-Q3 of 2014.

FINAL NOTES

The book will be published by Springer. The authors should submit previously unpublished text. The publisher with copyedit the manuscripts and the authors will be required to proofread the final manuscripts. Authors of individual chapters will be required to sign a copyright agreement with the publisher.

Editor contact: kindrtnk@illinois.edu