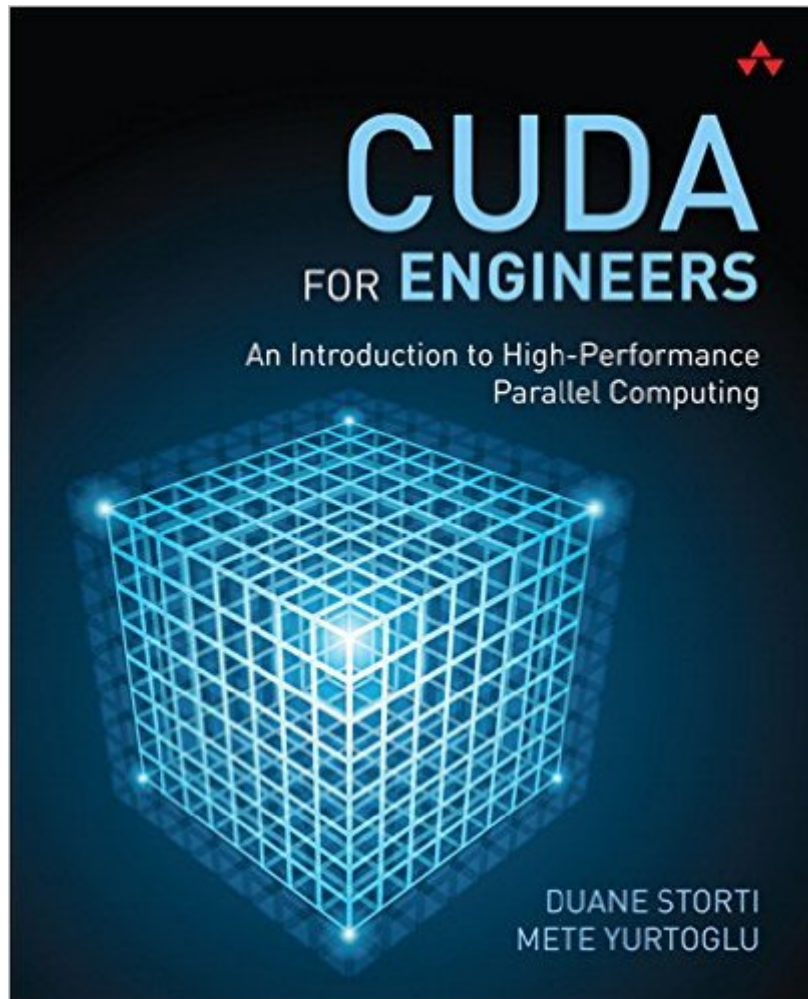# CUDA For Engineers: An Introduction To High-Performance Parallel Computing

Synopsis

CUDA for Engineers gives you direct, hands-on engagement with personal, high-performance parallel computing, enabling you to do computations on a gaming-level PC that would have required a supercomputer just a few years ago. Â The authors introduce the essentials of CUDA C programming clearly and concisely, quickly guiding you from running sample programs to building your own code. Throughout, youâ ™ll learn from complete examples you can build, run, and modify, complemented by additional projects that deepen your understanding. All projects are fully developed, with detailed building instructions for all major platforms. Â Ideal for any scientist, engineer, or student with at least introductory programming experience, this guide assumes no specialized background in GPU-based or parallel computing. In an appendix, the authors also present a refresher on C programming for those who need it. Â Coverage includes Preparing your computer to run CUDA programs Understanding CUDAâ ™s parallelism model and C extensions Transferring data between CPU and GPU Managing timing, profiling, error handling, and debugging Creating 2D grids Interoperating with OpenGL to provide real-time user interactivity Performing basic simulations with differential equations Using stencils to manage related computations across threads Exploiting CUDAâ ™s shared memory capability to enhance performance Interacting with 3D data: slicing, volume rendering, and ray casting Using CUDA libraries Finding more CUDA resources and code Â Realistic example applications include Visualizing functions in 2D and 3D Solving differential equations while changing initial or boundary conditions Viewing/processing images or image stacks Computing inner products and centroids Solving systems of linear algebraic equations Monte-Carlo computations Â

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Customer Reviews

This is an outstanding, relevant and timely text. However, the real question is: for the price, how does it compare to the plethora of FREE materials online from NVIDIA?First, registration and access to the online supplements from Addison at informit dot com is a MUST. As anyone knows who has mastered a new language, "wash on, wash off" (intense, repeated skill practice) is a must, and the steps to proficiency (especially if you know some C or C++), are really here with the online examples in addition to those in the book.On relevance, the battle between GPU and CPU supercomputing/ hpc is hardly over, regardless of IBM and Intel "flooring" the processing Ferrari with new GPU competitors. Just look at DOD buying truckloads of gaming platforms lately (including gaming systems, not just Alienware!) to pull and wire the GPUs into workstation HPCs. Buyers have to decide if the GPU phenomenon will last the next 10 years in HPC, but NVIDIA is investing SO much in this community that even hybrid CPU/GPUs like the old math co-processor dance and integration will NOT obviate you getting into this now, even if your career is just starting.I teach HPC online, but more from the circuit/CPU/GPU side than code, so my students are more C types from that point of view. Even so, if you don't have access to Argonne, Los Alamos or NOAA, this text clearly gives you the skills to work at differential equation level on gaming workstations, which is enough to get your projects to the stage of sharing time on the bigger machines. The text covers all the topics you need, in fine fashion, to understand the GPU angle of HPC, without making it so specific that it won't help your overall HPC skills.

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