



CUDA Handbook: A Comprehensive Guide to GPU Programming, The

By Nicholas Wilt

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The CUDA Handbook begins where *CUDA by Example* (Addison-Wesley, 2011) leaves off, discussing CUDA hardware and software in greater detail and covering both CUDA 5.0 and Kepler. Every CUDA developer, from the casual to the most sophisticated, will find something here of interest and immediate usefulness. Newer CUDA developers will see how the hardware processes commands and how the driver checks progress; more experienced CUDA developers will appreciate the expert coverage of topics such as the driver API and context migration, as well as the guidance on how best to structure CPU/GPU data interchange and synchronization.

The accompanying open source code—more than 25,000 lines of it, freely available at www.cudahandbook.com—is specifically intended to be reused and repurposed by developers.

Designed to be both a comprehensive reference and a practical cookbook, the text is divided into the following three parts:

Part I, Overview, gives high-level descriptions of the hardware and software that make CUDA possible.

Part II, Details, provides thorough descriptions of every aspect of CUDA, including

- Memory
- Streams and events
- Models of execution, including the dynamic parallelism feature, new with CUDA 5.0 and SM 3.5
- The streaming multiprocessors, including descriptions of all features through SM 3.5
- Programming multiple GPUs
- Texturing

The source code accompanying Part II is presented as reusable microbenchmarks

and microdemos, designed to expose specific hardware characteristics or highlight specific use cases.

Part III, Select Applications, details specific families of CUDA applications and key parallel algorithms, including

- Streaming workloads
- Reduction
- Parallel prefix sum (Scan)
- N-body
- Image Processing

These algorithms cover the full range of potential CUDA applications.

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Editorial Review

From the Back Cover

About the Author

Nicholas Wilt has been programming professionally for more than twenty-five years in a variety of areas, including industrial machine vision, graphics, and low-level multimedia software. While at Microsoft, he served as the development lead for Direct3D 5.0 and 6.0, built the prototype for the Desktop Window Manager, and did early GPU computing work. At NVIDIA, he worked on CUDA from its inception, designing and often implementing most of CUDA's low-level abstractions. Now at Amazon, Mr. Wilt is working on cloud computing technologies relating to GPUs.

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Manuel Britton:

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