Data Parallel C++

"This book, now in its second edition, is the premier resource to learn SYCL 2020 and is the ONLY book you need to become part of this community."

— Foreword by Erik Lindahl,
GROMACS and Stockholm University

Learn how to accelerate C++ programs using data parallelism and SYCL.

SYCL enables access to parallel resources in modern accelerated systems. Now, a single C++ application can use any combination of devices–including GPUs, CPUs, FPGAs, and ASICs–that are suitable to the problems at hand.

This open access book enables C++ programmers to be at the forefront of this exciting and important development that is helping to push computing to new levels. This updated second edition is full of practical advice, detailed explanations, and code examples to illustrate key topics.

This book teaches data-parallel programming using C++ with SYCL and walks through everything needed to program accelerated systems. The book begins by introducing data parallelism and foundational topics for effective use of SYCL. Later chapters cover advanced topics, including error handling, hardware-specific programming, communication and synchronization, and memory model considerations.

All source code for the examples used in this book is freely available on GitHub. The examples are written in modern SYCL and are regularly updated to ensure compatibility with multiple compilers.

You will learn how to:

- Accelerate C++ programs using data-parallel programming
- Use SYCL and C++ compilers that support SYCL
- Write portable code for accelerators that is vendor and device agnostic
- Optimize code to improve performance for specific accelerators
- Be poised to benefit as new accelerators appear from many vendors

ISBN 978-1-4842-9690-5

Shelve in:
Programming

User level:
Intermediate

SOURCE CODE ONLINE

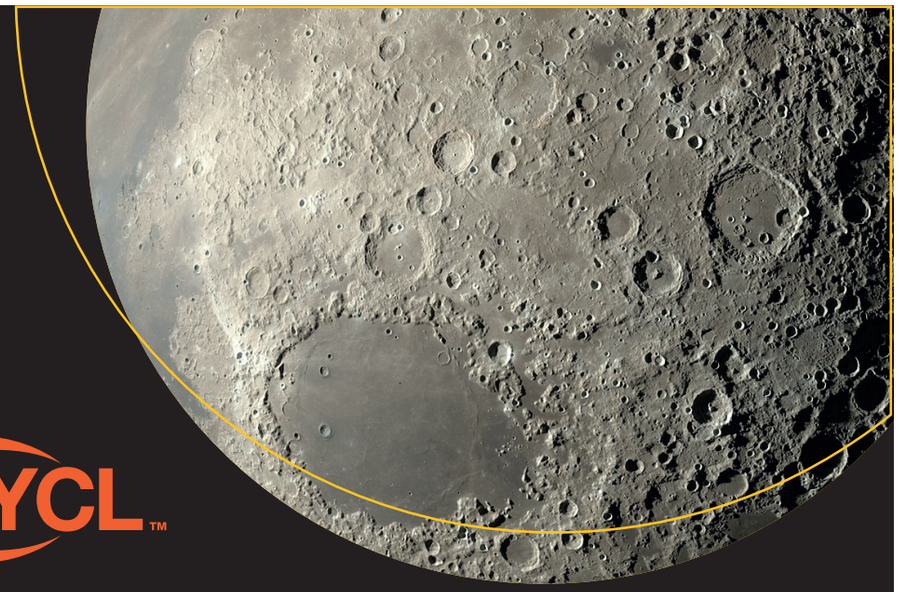
Apress open

Reinders · Ashbaugh · Brodman · Kinsner · Pennycook · Tian

Data Parallel C++

Second Edition

Apress open



SYCL™

Data Parallel C++

Programming Accelerated Systems using C++ and SYCL

Second Edition

James Reinders
Ben Ashbaugh
James Brodman
Michael Kinsner
John Pennycook
Xinmin Tian

Foreword by Erik Lindahl, GROMACS and Stockholm University

Apress open