# Fundamentals of Accelerated Computing with OpenACC

# Report of Contributions

https://indico.kit.edu/e/3819

Contribution ID: **1** Type: **not specified**

# Welcome and Introduction

*Tuesday, November 21, 2023 9:00 AM (15 minutes)*

- Meet the instructor.
- Create an account at courses.nvidia.com/join

Contribution ID: **2** Type: **not specified**

# Introduction to Parallel Programming

*Tuesday, November 21, 2023 9:15 AM (50 minutes)*

Learn about parallelism in a conceptual way, as well as how to express it with OpenACC. Topics that will be covered are as follows:

- Introduction to parallelism
- The goals of OpenACC
- Basic parallelization of code using OpenACC

Contribution ID: **3** Type: **not specified**

# Profiling with OpenACC

*Tuesday, November 21, 2023 10:15 AM (50 minutes)*

Learn how to build and compile an OpenACC code, the importance of profiling, and how to use the NVIDIA Nsight™ Systems profiler. Topics that will be covered are as follows:

- Compiling sequential and OpenACC code
- The importance of code profiling
- Profiling sequential and OpenACC multicore code
- Technical introduction to the code used in introductory modules

Contribution ID: **4** Type: **not specified**

# Introduction to OpenACC Directives

*Tuesday, November 21, 2023 11:50 AM (50 minutes)*

Learn how to parallelize your code with OpenACC directives and understand the differences between parallel, kernel, and loop directives. Topics that will be covered are as follows:

- The Parallel directive
- The Kernels directive
- The Loop directive

Contribution ID: **7** Type: **not specified**

# GPU Programming with OpenACC

*Tuesday, November 21, 2023 12:50 PM (50 minutes)*

Learn about the differences between GPUs and multicore CPUs, and manage memory with CUDA Unified Memory. Topics that will be covered are as follows:

- Definition of a GPU
- Basic OpenACC data management
- CUDA Unified Memory
- Profiling GPU applications

Contribution ID: **8** Type: **not specified**

# Data Management with OpenACC

*Tuesday, November 21, 2023 1:55 PM (50 minutes)*

Learn how to explicitly manage data movement with OpenACC data directives to reduce data transfers. Topics that will be covered are as follows:

- OpenACC data directive/clauses
- OpenACC structured data region
- OpenACC unstructured data region
- OpenACC update directive
- Data management with C/C++ Structs/Classes

Contribution ID: **9** Type: **not specified**

# Loop Optimizations with OpenACC

*Tuesday, November 21, 2023 2:55 PM (50 minutes)*

Understand the various levels of parallelism on a GPU and learn ways to extract more parallelism with OpenACC by optimizing loops in your code. Topics that will be covered are as follows:

- Seq/Auto clause
- Independent clause
- Reduction clause
- Collapse clause
- Tile clause
- Gang, Worker, Vector

Contribution ID: **10** Type: **not specified**

# Final Review

*Tuesday, November 21, 2023 3:55 PM (1 hour)*

- Review key learnings and answer questions.
- Complete the assessment and earn a certificate.
- Complete the workshop survey.