

Lectures on Modern Scientific Programming

Monday, November 23, 2015 - Wednesday, November 25, 2015

Wigner RCP

Scientific Program

23. Nov. 2015, Monday

Morning: 9:00-12:00

“Overview of modern hardware details and programming language basics”

Modern Computing Hardware (CPU/GPU)

Low-level insights to CPUs and GPUs

Overview of programming languages and paradigms

Afternoon: 13:30-16:30

“Development Tools”

Integrated Development Environments

Version Control Systems

Build Systems

24. Nov. 2015, Tuesday

Morning: 9:00-12:00

“Modern C++ I.”

Migrating from Fortran and C to modern C++

Language basics

New language features

Afternoon: 13:30-16:30

“Modern C++ II.”

Template Meta-programming

Multi-threading

Coding Guidelines and practices

Recommended libraries

Future tendencies

25. Nov. 2015, Wednesday

Morning: 9:00-12:00

“Introduction to GPU Programming”

GPU Programming APIs (CUDA, OpenCL, SyCL, C++AMP)

Language integration, compromises

Libraries, limitations

Future tendencies

Afternoon: 13:30-16:30

“Introduction to Functional Programming in Science”

Functional Programming basics

Functional constructs and parallelism

Examples from numerical physics, in C++

Outlook: connections to Category Theory