"APPLIED PARALLEL COMPUTING"
Education and Research Center

2 Days GPU Training Course

At Dublin City University (DCU), SCI-SYM (the centre for Scientific Computing and Complex Systems Modelling)

www.ichec.ie/news/1326896908

Requirements

- General programming experience.
- Basic knowledge of C, C++ and Fortran.
- Basic Linux user experience.

Outcome

Course attendees will learn how to perform fast porting of existing sequential applications onto NVIDIA GPUs using GPU-enabled math libraries, templated and directive-based programming. These methods are focused on rapid development, rather than maximum performance, and may better suite for large applications and limited resources.

Course Plan

Day 1

10:00 – 10:30 Registrations and welcoming (coffee break)

10:30 – 12:00 (APC)

1. From GPU to GPGPU
   - Performance and parallelism
   - GPU evolution
   - Parallel systems: multicore and clustering
2. CUDA programming model
   - Key principles
   - Understanding GPU capabilities

12:00 – 13:00 (APC)

2. CUDA programming model (cont.)
    - Introduction to the concept of threads & blocks
    - The memory hierarchy

13:00 – 14:00 – Lunch

14:00 – 15:30 (ICHEC)

3. CUDA libraries
    - Introduction to ICHEC and GPU system facilities
    - CUBLAS & MAGMA + phiGEMM
    - CUSPARSE
    - CUFFT
    - CURAND

15:30 – 15:45 – Coffee break

15:45 – 17:00 (APC)

4. Thrust
    - Transforms and functors
    - Placeholders and tuples
    - Performance considerations
    - Thrust and CUDA/C interoperability

17:00 – 17:30 (APC)

5. Rapid CUDA development with directives
    - Concept and OpenACC

Day 2

9:30 - 13:00

6. CUDA Guided practical session (APC + ICHEC assistance)
    - Simple CUDA programs: code, compile, run, profile, debug
    - Thrust: implement data processing transform, measure performance

14:00 – 16:30 (ICHEC)

7. HMPP and hands-on session

10:30 – 10:45 coffee break

13:00 - 14:00 lunch

15:30 – 15:45 coffee break