

## **BSC Training Course: Advanced Heterogeneous Programming on GPUs with MPI & OmpSs**

### **Objectives**

The tutorial will motivate the audience on the need for portable, efficient programming models that put less pressure on program developers while still getting good performance for clusters and clusters with GPUs.

More specifically, the tutorial will:

- Introduce the hybrid MPI/OmpSs parallel programming model for future exascale systems
- Demonstrate how to use MPI/OmpSs to incrementally parallelize/optimize:
  - MPI applications on clusters of SMPs, and
  - Leverage CUDA kernels with OmpSs on clusters of GPUs

### **Requirements**

#### **Prerequisites:**

Good knowledge of C/C++

Basic knowledge of CUDA/OpenCL

Basic knowledge of Paraver/Extrae

### **Learning Outcomes**

The students who finish this course will be able to develop benchmarks and simple applications with the MPI/OmpSs programming model to be executed in clusters and clusters of GPUs, and with the OmpSs@FPGA, to be executed on FPGA boards, like the Zedboard, or Xilinx ZCU102 and Alveo.

## [Academic Staff](#)

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**Course Convener:** Xavier Martorell

**Lecturers:**

**BSC - Computer Sciences department**

**Xavier Teruel** - Best Practices for Performance and Programmability - Recognised Researcher

**Xavier Martorell** - Programming Models - Parallel programming model - Group Manager

## [Materials](#)

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## [Further information](#)

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**BSC Training Courses do not charge fees.**

**NOTE: PLEASE BRING YOUR OWN LAPTOP.**

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For further details about Postgraduate Studies in UPC - Barcelona School of Informatics (FiB), visit the [website](#)

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