

PUMPS+AI Summer School 2023

Objectives

The 13th edition of the Programming and Tuning Massively Parallel Systems + Artificial Intelligence summer school (PUMPS+AI) is aimed at enriching the skills of researchers, graduate students and teachers with cutting-edge technique and hands-on experience in developing applications for many-core processors with massively parallel computing resources like GPU accelerators, with a special focus on artificial intelligence.

PUMPS+AI has become an ACM Europe Seasonal School!

- Further information here: <https://pumps.bsc.es/2023/>
- *Summer School Co-Directors*: [Mateo Valero](#) (BSC and UPC) and [Wen-mei Hwu](#) (University of Illinois at Urbana-Champaign / NVIDIA)
- *Local Organizers*: [Antonio J. Peña](#) (Chair, BSC), [Marc Jordà](#) (BSC)
- *Dates*:
Applications due: **30th April**

Due to space limitations, early application is strongly recommended. You may also be suggested to attend an online prerequisite training on basic CUDA programming before joining PUMPS.

Notification of acceptance: **12th May**

- *Organized by*:

Barcelona Supercomputing Center ([BSC](#))
Universitat Politècnica de Catalunya ([UPC](#))
University of Illinois at Urbana-Champaign ([University of Illinois](#))
HiPEAC Network of Excellence ([HiPEAC](#))

- The following is a list of some of the *topics* that will be covered during the course:

Deep Learning / AI engine internals
High-level programming models
CUDA Algorithmic Optimization Strategies
Dealing with Sparse and Dynamic data
Efficiency in Large Data Traversal
Reducing Output Interference

Controlling Load Imbalance and Divergence

Acceleration of Collective Operations

Dynamic Parallelism and HyperQ

Debugging and Profiling CUDA Code

Multi-GPU Execution

Architecture Trends and Implications

Introduction to OmpSs and to the Paraver analysis tool

OmpSs: Leveraging GPU/CUDA Programming

Hands-on Labs: CUDA Optimizations on Scientific Codes; OmpSs Programming and Tuning

- *Instructors:*

Featured Lecturers: Wen-mei Hwu (NVIDIA)

Invited Lecturers: [Juan Gómez-Luna](#) (ETH Zurich)

BSC / UPC Lecturers: [Antonio J. Peña](#), [Marc Jorda](#), [Leonidas Kosmidis](#), [Xavier Martorell](#) and [Xavier Teruel](#)



Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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