

## PUMPS + AI Summer School 2021

### Objectives

The Barcelona Supercomputing Center (BSC) in association with Universitat Politècnica de Catalunya (UPC) currently offer a number of courses covering CUDA architecture and programming languages for parallel computing. Please contact us for possible collaborations.

The eleventh 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.

The summer school is oriented towards advanced programming and optimizations, and thus previous experience in basic GPU programming will be considered in the selection process. We will also consider the current parallel applications and numerical methods you are familiar with, and the specific optimizations you would like to discuss.

Some of the topics that will be covered during the course are:

- \* DEEP Learning
- \* 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 tools
- \* OmpSs: Leveraging GPU Programming
- \* Hands-on Labs

- Important Dates:

Applications due: April 30, 2021

Notification of acceptance: May 31, 2021

Summer school: July 6-9, 2021 (tentative)

Early application is strongly recommended. You may also be suggested to attend an online prerequisite training on basic CUDA programming before joining PUMPS.

PUMPS is organized by the Barcelona Supercomputing Center, the University of Illinois, the Universitat Politècnica de Catalunya, the HiPEAC Network of Excellence, and the PRACE Advanced Training Centre.

Looking forward to see you at the PUMPS Summer School

Contact: pumps [at] bsc [dot] es  
<https://pumps.bsc.es/2021/>

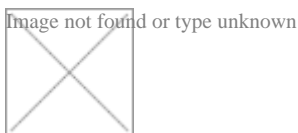
## Requirements

- Basic CUDA knowledge is required to attend the course. Applicants that cannot certify their experience in CUDA programming will be asked to take a short on-line course covering the necessary introductory topics
- C, C++, Java, or equivalent programming knowledge. Skills in parallel programming will be helpful

## Learning Outcomes

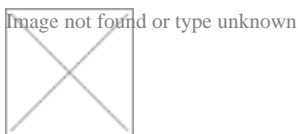
Participants will have access to GPU servers and will learn to program and optimize applications and AI techniques in languages such as CUDA and OmpSs. Teaching Assistants will be available to help with your hands-on lab assignments. At poster and hackathon sessions you may show your current work and applications you are optimizing. NVIDIA will award the best poster presentation.

### Academic Staff



- PUMPS Co-Directors:  
Mateo Valero (BSC-UPC) and Wen-mei Hwu (Univ. of Illinois)
- Local Organization Chair:  
Antonio J. Peña (BSC)
- PUMPS 2021 Distinguished Lecturer:  
Wen-mei Hwu (UIUC and NVIDIA)

### Further information



[For more information please visit the PUMPS website.](#)

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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