7th PUMPS Summer School, 2016

Objectives

- ***Organized by*:**
  - Barcelona Supercomputing Center (BSC)
  - University of Illinois at Urbana-Champaign (University of Illinois)
  - Universitat Politecnica de Catalunya (UPC)
  - HiPEAC Network of Excellence (HiPEAC)
  - PUMPS is part of this year PRACE Advanced Training Centre program
- The following is a list of some of the *topics* that will be covered during the course:
  - 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*:
  - Distinguished Lecturers: **Wen-mei Hwu** (University of Illinois at Urbana-Champaign) and **David Kirk** (NVIDIA Corporation)
  - Invited Lecturer: Juan Gómez-Luna (Universidad de Córdoba)
  - BSC / UPC Lecturers: Xavier Martorell and Xavier Teruel
  - Teaching Assistants: Abdul Dakkak, Carl Pearson, Simon Garcia de Gonzalo, Marc Jorda, Pau Farre, Javier Bueno, Aimar Rodriguez
- *Prerequisites for the course are*:
  - 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

Preliminary Overview

- By the end of the summer school, participants will:
    - Be able to design algorithms that are suitable for accelerators.
    - Understand the most important architectural performance considerations for developing parallel applications.
    - Be exposed to computational thinking skills for accelerating applications in science and engineering.
    - Engage computing accelerators on science and engineering breakthroughs.

- Programming Languages: CUDA, MPI, OmpSs, OpenCL
- Hands-on Labs: Afternoon labs with teaching assistants for each audience/level.
    - Participants are expected to bring their own laptops to access the servers with GPU accelerators.
    - The afternoon lab sessions will provide hands-on experience with various languages and tools covered in the lectures and will comprise a brief introduction to the programming assignments, followed by independent work periods. Teaching assistants will be available in person and on the web to help with assignments.

Requirements

Basic knowledge of C/C++ programming
Attendees will need to bring their own laptops with a SSH client

Registration for this course is now opened.

All PATC Courses at BSC do not charge fees.
PLEASE BRING YOUR OWN LAPTOP.

The Barcelona Supercomputing Center (BSC) in association with Universitat Politecnica de Catalunya (UPC) has been awarded by NVIDIA as a GPU Center of Excellence. BSC and UPC currently offer a number of courses covering CUDA architecture and programming languages for parallel computing. Please contact us for possible collaborations.

The seventh edition of the Programming and Tuning Massively Parallel Systems summer school (PUMPS) 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.

- *Summer School Co-Directors*: **Mateo Valero** (BSC and UPC) and **Wen-mei Hwu** (University of Illinois at Urbana-Champaign)
- *Local Organizers*: Antonio J. Peña (BSC), Victor Garcia (BSC and UPC), and Nacho Navarro (BSC and UPC)

Comments:

- *Dates*:
  - Applications due: **May 31, 2016**
    - 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: **June 10, 2016**
  - Summer school: **July 11-15, 2016**

Recommended Accomodation:

Please follow the link for map of some local hotels.

Contact Us:

bcw2016 [at] bcw [dot] ac [dot] upc [dot] edu (subject: PUMPS%202016) (CONTACT the school organisers) about any PUMPS related issues.

CONTACT Education and Training at BSC for further details about MSc, PhD, Post Doc studies, exchanges and collaboration in education and training with BSC.
For further details about Postgraduate Studies in UPC - Barcelona School of Informatics (FiB), visit the website.

Sponsors:

Funding and support for this Summer School, including students grants, computing resources and technical expertise, is provided by the following:
Barcelona Supercomputing Center,
NVIDIA Corporation,
HiPEAC Network of Excellence,
University of Illinois,
Universitat Politecnica de Catalunya,
the PRACE Advanced Training Centre,
the Spanish Supercomputing Network (RES-MINECO)

Materials

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