PRACE Autumn School
25th – 29th October 2010, Barcelona, Spain

MONDAY 25th	TUESDAY 26th	WEDNESDAY 27th	THURSDAY 28th	FRIDAY 29th
9:30				
Registration & coffee				
10:30	**10:00**	**10:00**	**10:00**	**10:00**
Welcome Speech	MPI	MPI	Open MP Programming	Open MP Programming
	GPU Programming	GPU Programming	StarSs	Co-Array Fortran
	Debugging Tools	Performance Analysis	Performance Analysis	
11:00	**11.15**	**11.15**	**11.15**	**11.15**
Basic Programming Models	Coffee break	Coffee break	Coffee break	Coffee break
Chapel				
Debugging Tools				
13:00	**13:00**	**13:00**	**13:00**	**13:00**
Lunch	Lunch	Lunch	Lunch	Lunch
		Family photo		MareNostrum visit
14:30	**14:30**	**14:30**	**14:30**	**14:30**
MPI	MPI	MPI	Open MP Programming	Open MP Programming
Chapel	GPU Programming	GPU Programming	StarSs	Co-Array Fortran
Debugging Tools	Debugging Tools	Performance Analysis	Performance Analysis	
		17:00		**17:00**
		MareNostrum visit		Conclusions
		20:00		
		Social event:Dinner at Tapa Tapa MareMagnum		

Joint Events: for all the attendees

Track A: Basic HPC programming

Track B: Alternative HPC programming models and techniques

Track C: Analysis of HPC applications

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TRACK A

Basic Programming Models (Xavier Martorell)
Monday 25th 11:00

- Introduction
- Key Concepts

MPI (Rajeev Thakur)

Monday 25th

14:30-15:45: Intro to MPI and parallel programming
16:00-17:00: Hands-on

Tuesday 26th

10:00-11:15: More on MPI
  - buffering and deadlock issues, performance
  - Understanding hotspots: mesh exchange example
  - Collective communication

11:30-13:00: Hands-on: Implement various ways of doing MPI broadcast

14:30-15:45: Advanced Features of MPI
  - Profiling interface, using it to find errors
  - MPI communicators and why they are needed
  - Derived datatypes
  - Process topologies

16:30-17:00: MPI and Multicore

Wednesday 27h

10:00-11:15: Intro to Parallel I/O and MPI-IO
11:30-13:00: Tuning MPI-IO
14:30-16:00: MPI at Exascale

OpenMP Programming (Alex Durán)
Thursday 28th 10:00; Thursday 28th 14:30;
Friday 29th 10:00; Friday 29th 14:30;

- Syntax and basic concepts
- Synchronization
- Hands-on
- Worksharing parallelism
- Hands-on on worksharing parallelism
- Task parallelism
- Hands-on on task parallelism
- Other OpenMP concepts
- Optimizations
- Hands-on on optimizations
- The next OpenMP

TRACK B

Chapel (Brad Chamberlain)
Monday 25th

11:00-11:30: Chapel Background
11:00-12:00: Language Basics
12:30-13:00: Data Parallelism
12:30-13:00: Hands-on I
14:30-15:00: Task Parallelism
15:00-15:30: Locality and Affinity
15:30-16:00: Status and Sample Computations
16:00-17:00: Hands-on II

Accelerator programming (Nacho Navarro & Manuel Ujaldón)

Tuesday 26th

10:00-11:15: GPGPU: General-purpose GPU Programming

11:30-13:00: CUDA Architecture, Threading and Memory model

14:30-15:30: CUDA Programming, Runtimes and Environments

15:30-17:00: Hands-on Lab 1: CUDA Environment Setup, Compilation and Execution Examples

Wednesday 27th

10:00-11:15: CUDA Optimizations. Debugging and Profiling

11:30-13:00: GPU Multiprocessing. Deploying Multi-GPU Applications

14:30-15:30: The GPU on Heterogeneous and High-Performance Computing

15:30-17:00: Hands-on Lab 2: Advanced Tools and Exercises. HPC Codes and Performance Evaluation

StarSs (Rosa Maria Badia)
Thursday 28th 10:00; Thursday 28th 14:30

- StarSs overview
- Sample code
- Single node hands-on
- Hybrid model MPI/SMPSs
- Programming examples
- MPI/SMPSs hands-on
- Performance analysis

Co-Array Fortran (David Henty)
Friday 29th

10:00: Basic coarray syntax
10:45: Practical session 1
11:30: Further coarray features
12:15: Practical session 2
14:30: Advanced features
15:00: Practical session 3

TRACK C

Debugging tools (John Donners)

Monday 25th

11:00-12:30: Introduction to serial debugging
12:30-13:00: Compiler flags and environment variables
14:30-15:00: Introduction to TotalView
14:30-17:00: Demos

Tuesday 26th

10:00-10:30: Parallel tools
10:30-11:00: Debugging MPI codes with TotalView
11:00-13:00: Hands on
14:30-15:00: Debugging OpenMP codes with Totalview
15:00-17:00: Hands-on

Performance Analysis (Jesus Labarta, Judit Gimenez)

Wednesday 27th

10:00-11:15: Introduction to performance analysis with Paraver
11:30-13:00: Dimemas Performance Prediction
14:30-17:00: Demos
  - Hands-on

Thursday 28th

10:00-11:15: Advanced functionalities (I)
  - Working with large traces
  - Methodology: Scalability model

11:30-13:00: Advanced functionalities (II)
  - clustering
  - instrumentation+sampling

14:30-17:00: Demos
  - Hands-on