

# Supercomputing in Portugal: recent news

Pedro Alberto

Centro de Física Computacional  
Laboratório de Computação Avançada  
Universidade de Coimbra

# HPC clusters in Portugal

- HPC clusters are scattered all over Portugal, from Braga to Évora
  - Several sizes, typically 100-200 core clusters with GigE (SEARCH in UMinho has 10G Myrinet)
  - Univ. Porto has a GRID of 4 clusters (totaling 336 cores)
  - RNCA is a network to share resources of clusters in 4 universities (in total 769 cores)
  - U Coimbra has “Milipeia”, a GigE 520 core cluster



# Some ongoing projects

- University of Minho
  - Hybrid CPU/GPU programming
- University of Porto
  - Voluntary computing using desktops in computer rooms
  - Setup of virtual clusters over the grid
  - Optimizing the power consumption over the grid infrastructure
  - CRACS group: Parallel Algorithms for Network Motifs Discovery. Has new 2-node 6-core AMD and Intel CPU clusters



# Some ongoing projects

## ■ University of Coimbra

- elastic computing
- Supercomputing service based on Milipeia (more on that later)
- International projects
  - iberian (approval pending) – setting up ibero-american communities and resources for using HPC resources in biology, astronomy, lattice QCD and climate applications
  - PRACE – participation in PRACE –IP; member of the PRACE AISBL council ;
- code OCTOPUS is part of the official PRACE benchmark
- New 128-core DDR infiniband cluster with 7 Fermi GPUs



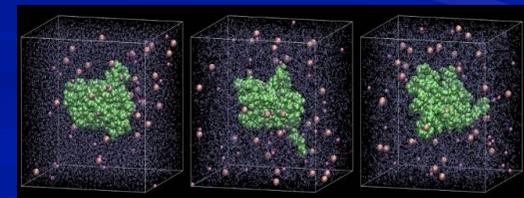
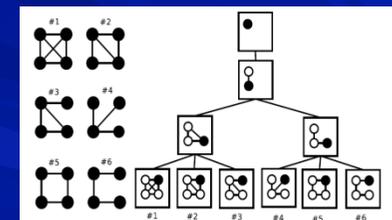
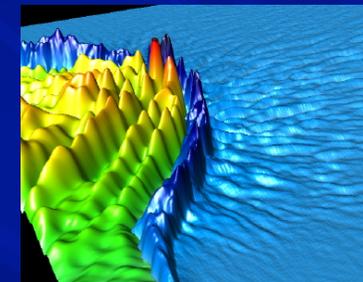
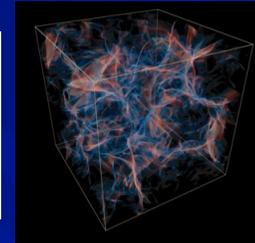
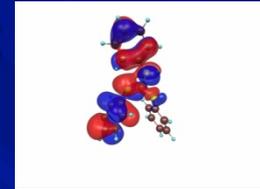
# Some ongoing projects

- Instituto Superior Técnico (Golp group)
  - Award of DEISA DECI Grants (PATEF and LIMA) for Jugene – the largest supercomputer in Europe (294.912 PowerPC 450 cores) in Jülich Supercomputer Center, Germany
  - Participation in the Scaling Workshop in Jülich and demonstration of strong scaling of the plasma physics code OSIRIS using the all Jugene processors with  $> 85\%$  efficiency
  - Participation as a 3<sup>rd</sup> party in PRACE-IP



■ Examples of scientific areas involved in HPC:

- Physics (high energy, condensed matter, astrophysics, plasma )
- Chemistry (molecular structure studies, including pharmacological studies)
- Biology (protein folding/unfolding)
- Engineering (Mechanical, Chemical, Civil)
- Climate
- Applied mathematics (optimization, PDEs, Linear Algebra)
- Computer science (ex.: network motifs, GPUs, elastic computing)



## ■ Other internacional collaborations

- Portugal|UT-Austin (PhD sholarships and research programs in Advanced Computing)
- courses and worshops in colaboration with TACC:  
2010 Summer School in e-Science with Many-Core CPU/GPU Processors in University of Minho

