

## **2) Mirco Mazzucato**

### **Scientific Computing: an historical and inspired view**

The main steps in the evolution of Scientific Computing (SC) in the last 40 years will be reviewed, from its origin when it was a small component of the mainframes developed to control nuclear power plants or rockets until today when it can rely on dedicated very large robust world-wide distributed Grid or Cloud infrastructures. It is a history of progressive technological diversification which has enabled SC to provide Scientists with the largest, most effective and easy to use computing power for the available money satisfying their different specific needs.

From one side mainframes have evolved as High Performance Computing (HPC) systems or Supercomputers, designed to solve at best the challenge of the execution of tightly coupled parallel jobs. To do this, they still stay within a particular site and focus on getting minimal latency between CPUs.

On the other side the High Throughput Computing (HTC) has exploited at best the possibility to execute a large number of loosely coupled tasks in different computing resources and has required the development of new architectures and computing models.

This talk will concentrate on HTC where INFN has played for 20 years a key pioneer role in Europe. The progress has been driven by the growth in the amount of IT resource required to process scientific data coming from increasingly complex detectors at CERN. The fast increasing demand has obliged IT scientific teams to develop new specific solutions which have then spread out worldwide and become often commercial products.

Scientific Computing has shown both to be able to effectively exploit technology advances driven by other sectors, such as desktops or personal computers, or LAN and WAN bandwidth or GPUs... and to develop new products that then became largely diffused.

Some of the most important challenges and successes will be described together with some lessons learned during my 30 years of activity in this field.