

Quantum Computing and High Performance Computing

CINECA 18 Dicembre 2018 – Casalecchio di Reno (BO)

Organizers: *Stefano Carretta (Uniparma), Carlo Cavazzoni (CINECA), Rosa Di Felice (CNR-Modena),
Leonardo Guidoni (Univaq), Chiara Macchiavello (Unipv)*

Local Organizers: *Francesco Benfenati (Univaq), Daniele Ottaviani (CINECA)*

Program

10:00-10:20 **Registration**

10:20-10:30 **Welcome**

10:30-11:30 **Hardware: Quantum Computers and Quantum Simulators**

- **Quantum Computing for the Real World Today**
Andy Mason (D-Wave)
- **IBM Q: quantum computers for research and business**
Federico Mattei (IBM-Italia)
- **Atos Quantum Learning Machine**
Ivano Pullano (Atos-Italia)

11:30-11:50 Coffee Break

11:50-12:50 **Quantum Machine Learning and Quantum Internet**

- **Quantum Machine Learning of Quantum properties**
Vittorio Giovannetti (Scuola Normale Superiore di Pisa)
- **An artificial neuron model implemented on the IBM quantum processor**
Dario Gerace (Università di Pavia)
- **Towards the Quantum Internet: a multidisciplinary effort**
Sara Cacciapuoti (Università di Napoli Federico II)

12:50-14:00 Lunch

14:00-15:00 **Applications on Quantum Annealers**

- **Application of D-Wave Two X to machine learning on protein-DNA binding data**
Rosa Di Felice (CNR - Center S3 - Modena)
- **QUBO formulation for the job shop scheduling**
Davide Caputo (Data Reply)
- **Quantum Annealing with continuous variables: an application to Matrix Factorization**
Daniele Ottaviani (CINECA)

15:00-15:20 Coffee Break

15:20-16:20 **Applications in Physical Sciences**

- **Quantum computing and its applications in chemistry and physics**
Ivano Tavernelli (IBM-Zurigo)
- **Quantum Simulation of spin models on IBM Quantum Computers**
Stefano Carretta (Università di Parma)
- **Quantum simulations of lattice gauge theories**
Simone Montangero (Università di Padova)

16:20-17:20 **Round Table Discussion**

Stefano Carretta (Uniparma), Carlo Cavazzoni (CINECA), Rosa Di Felice (CNR-Modena), Leonardo Guidoni (Univaq), Chiara Macchiavello (Unipv), Simone Montangero (Unipd), Fabio Sciarrino (UniSapienza)

Link to workshop web page (eventi.cineca.it): <https://goo.gl/RL3jZw>

The workshop has no registration fee but, because of limitations of the lecture hall **reservation is mandatory** through the website. The entire event will be also broadcasted in live streaming.