

PAOLO VIVIANI

PhD – Senior Researcher

Torino, ITALY @ paolo.vivi@gmail.com paoloviviani.github.io



PROFILE

I'm a theoretical physicist turned computer scientist with 5+ years of applied research experience in the field of HPC and ML/DL. My goal is to use supercomputers (including several TOP500 and two top 10 machines) to solve scientific and engineering problems, like developing and training machine learning models at scale. I'm also interested in developing algorithms to exploit the potential of near-term quantum computers, and to investigate their interactions with classical HPC. I've been involved in several funded research projects with different responsibilities, mostly as a principal technical contact point for a partner, and task leader.

EDUCATION

Ph.D., Computer Science

University of Torino

2015 – 2019 Torino, IT

Thesis: Deep Learning at Scale with Nearest Neighbours Communications. Supervisor: Marco Aldinucci. Funded by Noesis Solutions.

Master's Degree, Theoretical physics

University of Torino, 104/110

2015 Collegio Universitario "R. Einaudi", Torino

Scholarship winner: "Piano Lauree Scientifiche 2008", granted by Società Italiana di Fisica.

EXPERIENCE

LINKS Foundation

Senior Researcher, Advanced Computing

2021 – present Torino, IT

- HPC, Machine Learning and Big Data convergence – acceleration of scientific/technical applications
- Quantum algorithms and applications – discrete optimization on neutral atoms machines and quantum annealers
- ML/DL algorithms for neural signal decoding
- Funded research projects – proposals writing, technical management and execution
- ETP4HPC Working groups member

Noesis Solutions

Research Engineer

2015 – 2021 Novara, IT

- Machine learning methodologies for engineering modelling and design exploration
- Development of numerical code and software stack
- Supervisor of one internship
- Technical contact for funded research projects

MAIN INTERESTS

High Performance Computing

Machine Learning

Quantum software and algorithms

SKILLS

Parallel Computing	■ ■ ■ ■ ■
Quantum Computing	■ ■ ■ ■ ■
Machine Learning	■ ■ ■ ■ ■
Research project management	■ ■ ■ ■ ■
Cloud technologies	■ ■ ■ ■ ■

Programming

C++	■ ■ ■ ■ ■
Python	■ ■ ■ ■ ■
CUDA	■ ■ ■ ■ ■
Fortran	■ ■ ■ ■ ■
Git	■ ■ ■ ■ ■

Soft

Presentations	■ ■ ■ ■ ■
Communication of results	■ ■ ■ ■ ■
Formalization of requirements	■ ■ ■ ■ ■
Decomposition of problems	■ ■ ■ ■ ■

Tools

- Keras
- MxNet
- Pandas
- BLAS/Lapack
- MPI/OpenMP
- Dask
- PBS/Slurm
- Docker
- Qiskit
- Openstack
- Gitlab CI
- Linux
- IP Networking
- Latex

CISCO CCNA course completed in 2008.

LANGUAGES

Italian ■ ■ ■ ■ ■

English ■ ■ ■ ■ ■

French ■ ■ ■ ■ ■

RESEARCH ACTIVITY

Funded Research Projects

See paoloviviani.github.io/projects for full list and details.

B-CRATOS	 H2020-FET Open	 2021 – ongoing
ACROSS	 H2020-EuroHPC	 2021 – ongoing
Lexis	 H2020-ICT-11	 2021 – 2022
BoSS	 IMEC-ICON	 2018 – 2019
Fortissimo 2	 H2020-FoF project	 2016 – 2018
CloudFlow	 FP7-I4MS project	 2016 – 2017
MACH	 ITEA2	 2015 – 2016

Selected Publications

See paoloviviani.github.io/publications for full list.

1. Scionti, A. et al. *Distributed HPC Resources Orchestration for Supporting Large-Scale Workflow Execution in HPC, Big Data, and AI Convergence Towards Exascale: Challenge and Vision* First, 23 (CRC Press, New York, Jan. 2022).
2. Reniers, V. et al. *Authenticated and Auditable Data Sharing via Smart Contract* in (Association for Computing Machinery, Brno, Czech Republic, 2020), 324–331.
3. Reniers, V. et al. *Analysis of Architectural Variants for Auditable Blockchain-based Private Data Sharing* in *Proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing* (ACM, Limassol, Cyprus, 2019), 346–354.
4. Viviani, P., Drocco, M., Baccega, D., Colonnelli, I. & Aldinucci, M. *Deep Learning at Scale* in *Proc. of 27th Euromicro Intl. Conference on Parallel Distributed and network-based Processing (PDP)* (IEEE, Pavia, Italy, 2019), 124–131.
5. Aldinucci, M. et al. *HPC4AI, an AI-on-demand federated platform endeavour* in *ACM Computing Frontiers* (Ischia, Italy, May 2018).
6. Tordini, F., Aldinucci, M., Viviani, P., Merelli, I. & Liò, P. *Scientific Workflows on Clouds with Heterogeneous and Preemptible Instances* in *Proc. of the Intl. Conference on Parallel Computing, ParCo 2017, 12-15 September 2017, Bologna, Italy* (IOS Press, 2018).
7. Viviani, P., Drocco, M. & Aldinucci, M. *Scaling Dense Linear Algebra on Multi-core and Beyond: a Survey* in *Proc. of 26th Euromicro Intl. Conference on Parallel Distributed and network-based Processing (PDP)* (IEEE, Cambridge, United Kingdom, 2018).
8. Viviani, P., Torquati, M., Aldinucci, M. & d'Ippolito, R. *Multiple back-end support for the Armadillo linear algebra interface* in *In proc. of the 32nd ACM Symposium on Applied Computing (SAC)* (Marrakesh, Morocco, Apr. 2017), 1566–1573.

Other

- Co-supervisor of one M.Sc. Thesis
- Over 35 conference and journal papers reviewed
- Four PhD schools attended.
- Program Committee member, *Euromicro International Conference on Parallel, Distributed, and Network-based Processing (PDP)* for 2018 (also session chair), 2019 and 2020.
- Program Committee member, *Parallel Numerical Methods and Libraries for Heterogeneous Multi/Manycores (PDP2018 and PDP2019)*.
- Program Committee member, *Artifact Evaluation, Euro-Par 2018*
- Program Committee member, *16th IEEE International Conference on Scalable Computing and Communications (ScalCom 2016)*.

FREE TIME



Avid traveller and photographer.

Former track & field athlete, now turned to playground basketball.

 paoloviviani.github.io/portfolio

Photographer

OASIS Project

 2013  Kharga, Egypt

Archaeological expedition funded by Fondazione Collegio delle Università Milanesi and American University in Cairo.

Photographer

Collegio Universitario "R. Einaudi"

 2012 – 2014  Torino, Italy

Exchange student

Tauranga Boy's College

 2006  Tauranga, New Zealand

Scuba Diver

PADI Advanced Open Water Diver

 From 2004

Track and Field athlete

Javelin Throw – Regional and National competitions

 1997 – 2012



Volunteer

IAAF Athletics World Championship

 2009  Berlin, Germany

English Course

'General English Super Intensive' C1 level course at Alpha College of English

 2012  Dublin, Ireland

I authorize the use of my personal data in accordance with Italian Privacy Protection Law (30/06/2003, n.196/03), and GDPR (UE 2016/679)