
Personal Informations

Name Davide Oberto.
Place and date of birth Torino (Italy), 7th December 1996.
Citizenship Italian, French.
Languages Italian (native), French (native), English (fluent).

Academic positions

Nov.2024–Current **Research fellow**, *MathLab group at Scuola Internazionale Superiore di Studi Avanzati (SISSA) at Gianluigi Rozza's group*, Research topics: Scientific Machine Learning, non-intrusive Reduced Order Modeling, Computational Fluid Dynamics, Digital Twins.

Education

Ph.D. in Applied Mathematics

Nov.2021–Oct.2024 Dipartimento di Scienze Matematiche "Luigi Lagrange", Politecnico di Torino, *Obtained cum laude*.

Thesis title: *Machine Learning algorithms in Computational Fluid Dynamics: Improving Reynolds-Averaged Navier-Stokes equations by ML closure models*, Supervisor: *Prof. Stefano Berrone*.

Master of Science degree in Mathematical Engineering

2018–2020 **Politecnico di Torino**, GPA: 110 cum laude/110.

Thesis Title: "Computational simulation of the flow around rectangular cylinders: Effects of grid quality at wall". Thesis advisor: Prof. Luca Bruno

Sep.2019–Feb.2020 **École Centrale de Nantes**, *ERASMUS semester in the "Computational Mechanics" Master's degree class*.

Bachelor degree in Mathematical Engineering

2015–2018 Politecnico di Torino, GPA: 108/110.

Publications

Journal Articles

2025 Davide Oberto, Davide Fransos and Stefano Berrone, *Using Delayed Detached Eddy Simulation to create datasets for data-driven turbulence modelling: a periodic hills with parameterized geometry case*, Computers & Fluids.
doi:10.1016/j.compfluid.2024.106506

- 2022 Stefano Berrone and Davide Oberto, *An invariances-preserving vector basis neural network for the closure of Reynolds averaged Navier-Stokes equations by the divergence of the Reynolds stress tensor*, Physics of Fluids, 34.
doi:10.1063/5.0104605
- 2022 Luca Bruno and Davide Oberto, *Effects of cell quality in grid boundary layer on the simulated flow around a square cylinder*, Computers & Fluids, 238:105351.
doi:10.1016/j.compfluid.2022.105351

Chapters

- 2025 Davide Oberto, *Improving the Vector Basis Neural Network for RANS Equations Using Separate Trainings*, Numerical Mathematics and Advanced Applications ENUMATH 2023, Volume 2.
- 2025 Stefano Berrone, Davide Oberto, Moreno Pintore and Gioana Teora, *The lowest-order Neural Approximated Virtual Element Method*, Numerical Mathematics and Advanced Applications ENUMATH 2023, Volume 1.

In preparation

Davide Oberto, Maria Strazzullo and Stefano Berrone, *Machine Learning enhanced parametric Reynolds-averaged Navier-Stokes equations at the full and reduced order levels*, In preparation.

Conferences

Attended as contributed speaker at several national and international conferences.

- ParCFD **33rd Parallel CFD International Conference**, Alba, 2022.
- UMI Workshop **Matematica per l'Intelligenza Artificiale e il Machine Learning Giovani ricercatori**, Torino, 2022.
- ENUMATH **European Conference on Numerical Mathematics and Advanced Applications**, Lisbon, 2023.
- ECCOMAS **9th European Congress on Computational Methods in Applied Sciences and Engineering**, Lisbon, 2024.

Personal skills

- Coding **Bash**, Moderate knowledge, Scripting.
C++, Intermediate knowledge, Mainly as background language for OpenFoam.
Python, Everyday user, Scripting and AI tools development.
Matlab, Everyday user, For numerical methods code development.
- MOR libraries **ITHACA-FV**, Good knowledge, Implemented custom reduced solvers.
RBfenics, Basic knowledge, Used for teaching purposes.
pyGeM, Good knowledge, Used to generate geometrical deformations using Radial Basis Functions.
- AI **Tensorflow and PyTorch**, Developed several neural network models during my PhD.
- OS **Linux**, Everyday user, All my research performed in Ubuntu environment.
Windows, Everyday user.
- CFD **OpenFoam**, Everyday user, Implemented custom turbulence models and function objects.

Experiences

Research

- PostDoc research Research activity on reduced order modeling for advection-dominated flows with high Kolmogorov n -width and on Digital Twins.
- PhD research Research activity on cutting edge topic of machine learning algorithms for turbulence modelling in computational fluid dynamics.
- marinAI Industrial partnership with Fincantieri and Monte Carlo yachts to train AI-based ROMs for accurate propellers' efficiency and noise prediction.
- Sauber Motorsport collaboration Research collaboration during the PhD period with CFD methodology group of Sauber Motorsport Formula 1 team with a staying period of 6 months in their factory.

Supervision

- Ph.D. Started co-supervision activity of one Ph.D. student in SISSA on Digital Twins.
- M.Sc. Started supervision activity of two M.Sc. students in SISSA on CFD-related topics.

Teaching

- Topics in Computational Fluid Dynamics **PhD program in SISSA**, *Total of 5 hours*, Main topics: Discretization through Finite Element Method of: Stokes equations (inf-sup condition and stabilization) and Navier-Stokes equations (fixed point and Newton method for nonlinearity and time discretization).
- Numerical Linear Algebra **1st year in bachelor's programs**, *Total of 80 hours*, Main topics: Floating-point representation, Interpolation through polynomials and splines, Regression, Direct Methods for solving Linear Systems, Eigenvalue computation and Singular Value Decomposition.
- Numerical Methods and Scientific Computing **1st year in Aerospace Engineering masters**, *Total of 60 hours*, Main topics: Iterative Methods for solving Linear Systems, Preconditioning, Non-linear equations, ODEs, FD for 1D and 2D problems, FEM for 1D problems, numerical schemes for 1D conservation laws.

Revisions

- JCP Reviewed one paper for Journal of Computational Physics.