Matteo Barbieri

Aeronautical Engineer · CFD & Meshing · M.Sc. student

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Education

M.Sc. Aeronautical Engineering 2025 – exp. 2028
Politecnico di Milano

B.Sc. Aerospace Engineering 2022 – 2025
Politecnico di Milano

Work Experience

Computational Fluid Dynamics Engineer Sep 2025 – Nov 2026
Dynamis PRC – Formula Student Team

- **Meshing & solver:** snappyHexMesh studies on 60M+ cell full-car models to improve layer coverage and mesh quality; tuned schemes and SIMPLE parameters for stability on limited resources.
- **Automation & codebase:** Bash/Python workflows for simulation and post-processing; sole maintainer of the team's CFD repository (Git, case standardization).
- **Coordination:** co-defined strategy with Aero & Cooling leads; standardized workflows for a 7-person team.

Aerodynamicist Apr 2024 – Aug 2025
Dynamis PRC – Formula Student Team

- Co-developed Rear Wing and T-Tray, from airfoil selection to CFD validation in OpenFOAM.
- Worked with Vehicle Dynamics on aerodynamic balance and CoP migration.

Personal R&D Projects

MetiX – layer-first polyhedral mesher for OpenFOAM In development
Private repository

- Polygonal prism layers from tangent-plane dual points: planar on analytic surfaces, near-planar elsewhere.
- Octree BCC seeding and Delaunay/Voronoi polyhedral core, conformal with the last layer.
- Graded sizing field, Lloyd (CVT) smoothing and skewness repair.

OpenFOAM solver & turbulence model development

- **curvature-correction** (public): curvature-corrected SST and Spalart–Allmaras models for OpenFOAM v2412.
- **coupledFoam** (private, in development): pressure–velocity coupled solver, 4×4 block system in PETSc with Rhie–Chow.

Nova Propellers (public) – propeller & rotor design workbench Alpha – results not certified

- Local-first workbench for propellers and rotors (HAWT, VAWT, marine): blade geometry, BEMT/lifting-line, optimization, parametric studies, STL export; OpenFAST/PyWake links; Linux app (Tauri + FastAPI).

University Projects

- **Wind Engineering** (M.Sc. group project, MATLAB): multibody truck model with tyre contact and driver controller to assess rollover risk in crosswind gusts.
- **Structural Dynamics & Aeroelasticity** (M.Sc. assignments, MATLAB): Ritz–Galerkin model of a strut-braced wing; static aeroelasticity (divergence, aileron reversal).
- **Experimental Fluid Dynamics lab** (ongoing): laboratory and wind tunnel measurements (force balances, hot-wire anemometry, PIV) and data post-processing.
- **Other M.Sc. courses:** Vehicle Aerodynamics · Wind Turbine Design (both ongoing)

Technical Skills

CFD & Meshing	OpenFOAM, ANSA, snappyHexMesh, STAR-CCM+ (basic), ParaView
CAD	Siemens NX, SolidWorks, Inventor, Solid Edge
Programming	Python (NumPy, Pandas, Matplotlib), C++, MATLAB, Bash; Linux, SSH, Git, LaTeX
AI & LLMs	AI agents and LLMs for coding and engineering workflows
Languages	Italian (native), English (B2 – TOEIC 890/990)