

MICHELE COGO

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Education

Master's degree in Aerospace Engineering

Oct 2018 – Oct 2020

Università degli studi di Padova

Padova, Italy

- Thesis: Large eddy simulation with wall-stress model: an application to turbulent compressible channel flow;
- Final grade: 110/110 cum laude.

Bachelor degree in Aerospace Engineering

Oct 2015 – Jul 2018

Università degli studi di Padova

Padova, Italy

- Thesis: Dynamics of a sphere at high Reynolds number flows.

Scientific High school qualification

Sep 2010 – Jun 2015

Liceo scientifico Jacopo da Ponte

Bassano del Grappa, Italy

Academic Employment

PhD Student

Oct 2021 – Present

Università degli studi di Padova, CISAS

Padova, Italy

- Research activity on high fidelity simulations of high-speed flows for aerospace applications;
- Supervisor: Prof. Francesco Picano.

Visiting Student Researcher

Jun 2023 – Nov 2023

Stanford University, Center for Turbulence Research

Stanford, California

- Research activity on wall-models for hypersonic turbulent boundary layer with chemical reactions;
- Supervisor: Prof. Parviz Moin.

Visiting Student Researcher

Oct 2022 – Feb 2023

Delft University of Technology, Department of Flow Physics and Technology

Delft, Netherlands

- Research activity on high fidelity simulations of compressible boundary layers over rough surfaces;
- Supervisor: Prof. Davide Modesti.

Teaching assistant

Mar 2021 – Present

Università degli studi di Padova

Padova, Italy

- Teaching assistant (Didattica integrativa) for the course of Laboratory of CFD at Aerospace Engineering held by Prof. Federico Dalla Barba;
- Teaching assistant (Didattica integrativa) for the course of Aerodynamics 2 at Aerospace Engineering held by Prof. Francesco Picano;
- Teaching assistant (Didattica integrativa) for the course of Fluid Mechanics at Mechanical Engineering held by Prof. Andrea Marion.

Scholarship for research activity

Dec 2020 – August 2021

Università di Roma 'La Sapienza'

Roma, Italy

- Scholarship for research activity on Direct Numerical Simulation of compressible turbulent boundary layers;
- Supervisor: Prof. Matteo Bernardini

Extracurricular activities

Morpheus Team

10/2019 — 09/2020

University project

- Participation to a students project developing a rover for planetary exploration at Università degli studi di Padova;
- During this project the candidate acquired basic experience with the Robot Operating System (ROS) for obstacle avoidance with LIDAR technology.

THRUST Team

10/2019 — 09/2020

University project

- Participation to the "Transdisciplinary Hybrid Rocket for University Students' Training" project at Università degli studi di Padova ([website](#));
- The candidate helped the foundation of this students project by working on the development of the first computational model of the gas dynamics involved in the hybrid engine using Matlab and Simulink.

Conferences and Workshops

76th Annual Meeting of the APS Division of Fluid Dynamics

19/11/2023 — 21/11/2023

Congress in Washington D.C., USA

- Presentation of "Development of a wall model for chemically-reacting turbulent hypersonic boundary layers" and participation to the seminars.

14th European Fluid Mechanics Conference

13/09/2022 — 16/09/2022

Congress in Athens, Greece

- Presentation of "Compressibility effects in supersonic and hypersonic turbulent boundary layers at high Reynolds numbers" and participation to the seminars.

33rd Parallel CFD International Conference

25/05/2022 — 27/05/2022

Congress in Alba, Italy

- Presentation of "DNS of supersonic and hypersonic turbulent boundary layers at moderate-high Reynolds numbers with heat transfer" and participation to the seminars.

14th WCCM-ECCOMAS Congress 2020

11/01/2020 — 15/01/2020

Virtual Congress

- Presentation of the article "A wall-modeled/wall-resolved Les method for turbulent wall flows" and participation to the seminars and virtual meetings.

Concurrent Design Engineering Workshop

29/04/2019 – 03/05/2019

ESA - European Space Agency

Libin Redu, Belgium

- Workshop on principles of concurrent engineering at ESA's European Space Security and Education Centre (ESEC);
- Final grade: A - Outstanding performance with only minor errors.

Honours and Awards

Fulbright Scholarship

01/08/2022

The U.S.-Italy Fulbright Commission

Rome, Italy

- Selected as Fulbright scholar (Visiting student researcher) to conduct a research activity at Stanford University from June 1, 2023 to November 30, 2023 under the supervision of Prof. Parviz Moin.

Zegna Founder's scholarship

06/2023

Zegna Group

Milan, Italy

- Scholarship supporting the research activity at Stanford University from June 1, 2023 to November 30, 2023 under the supervision of Prof. Parviz Moin.

Excellence award for Aerospace Engineering Master's Thesis

01/10/2020

Università degli Studi di Padova

Padova, Italy

- Excellence award for the thesis work assigned from the graduation committee with the evaluation of an external supervisor (prof. Matteo Bernardini from Università di Roma 'La Sapienza').

Incentives for scientific studies

31/01/2018

Università degli Studi di Padova

Padova, Italy

- University contribution for talented students pursuing scientific studies.

Publications List

Peer reviewed journal

- Michele Cogo, Umberto Baù, Mauro Chinappi, Matteo Bernardini, Francesco Picano. Assessment of heat transfer and Mach number effects on high-speed turbulent boundary layers. *Journal of Fluid Mechanics*. 2023;974:A10. <https://doi.org/10.1017/jfm.2023.791>
- Francesco De Vanna, Filippo Avanzi, Michele Cogo, Simone Sandrin, Matt Bettencourt, Francesco Picano and Ernesto Benini (2023). URANOS: A GPU accelerated Navier-Stokes solver for compressible wall-bounded flows. *Computer Physics Communications*, 108717. <https://doi.org/10.1016/j.cpc.2023.108717>
- Michele Cogo, Francesco Salvatore, Francesco Picano, and Matteo Bernardini (2022). Direct numerical simulation of supersonic and hypersonic turbulent boundary layers at moderate-high Reynolds numbers and isothermal wall condition. *Journal of Fluid Mechanics*, 945, A30. <https://doi.org/10.1017/jfm.2022.574>
- Francesco De Vanna, Michele Cogo, Matteo Bernardini, Francesco Picano, and Ernesto Benini. (2021). Unified wall-resolved and wall-modeled method for large-eddy simulations of compressible wall-bounded flows. *Physical Review Fluids*, <https://doi.org/10.1103/PhysRevFluids.6.034614>;

Conference paper

- Francesco De Vanna, Filippo Avanzi, Michele Cogo, Simone Sandrin, Matt Bettencourt, Francesco Picano and Ernesto Benini. GPU-acceleration of Navier-Stokes solvers for compressible wall-bounded flows: the case of URANOS. *AIAA SCITECH 2023 Forum*, 2023, <https://doi.org/10.2514/6.2023-1129>.
- Francesco De Vanna, Michele Cogo, Matteo Bernardini, Francesco Picano, and Ernesto Benini. A straightforward strategy to unify WR/WMLES approaches for compressible wall-bounded flows. *AIAA SCITECH 2022 Forum*, 2022, <https://doi.org/10.2514/6.2022-0181>.
- Francesco De Vanna, Michele Cogo, Matteo Bernardini, Francesco Picano, and Ernesto Benini. A wall-modeled/wall-resolved les method for turbulent wall flows. In *14th WCCM-ECCOMAS Congress 2020*, 2021, <https://doi.org/10.23967/wccm-eccomas.2020.045>.

Master's Thesis

Aerospace Engineering Master's Thesis, Università degli studi di Padova

2020

- Michele Cogo, Large eddy simulation with wall-stress model: an application to turbulent compressible channel flow, <http://tesi.cab.unipd.it/64702>.

Referee for peer-reviewed journals

2023

- *Journal of Fluid Mechanics*
- *Physics of Fluids*

High-performance computing research grants

ISCRA-C call

(PI)

Compressible turbulent Boundary Layers over Rough Surfaces (CBL-RS)

06/2023 – 12/2023

- Grant of 10'000 GPU hours on Leonardo Booster (CINECA, Italy).

ISCRA-C call

(PI)

Reentry module Dynamics in mars' atmosphere at Mach 5 (RED-M5)

15/04/2022 – 15/01/2023

- Grant of 2'000 node hours on Marconi100 (CINECA, Italy).

PRACE call 23

co-PI

Large-scale numerical simulations of Mars supersonic Parachute dynamics

01/10/2021 – 30/09/2022

- Grant of 99'432 node hours on Marconi100 (CINECA, Italy).

Technical Skills

Programming languages: Fortran, C++, Python, Matlab/Simulink

Engineering Softwares: Ansys Fluent, Patran/Nastran, Solidworks, Paraview, Tecplot

Graphics and animation: Adobe Illustrator, Manim