

M.Sc. Pietro Carlo Boldini

Curriculum Vitae

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Personal Details

Date and place of birth 08th November 1993, Pisa (Italy)
Nationality Italian

Education

- 10/2020–present **PhD Mechanical Engineering**, *Delft University of Technology (NL)*
Process & Energy Department, Faculty of Mechanical Engineering.
Dissertation: *Boundary-layer transition with fluids at supercritical pressure*. Supervisor: Prof. R. Pecnik.
Selected courses:
○ Machine learning in fluid mechanics
○ Programming using GPU CUDA
- 4/2016–11/2018 **M.Sc. Aerospace Engineering**, *University of Stuttgart (DE)*, Grade: 1.2 (with distinction, top < 4%)
Specialization areas:
○ Mathematical and Physical Modelling in Fluid and Gas Dynamics
○ Space Flight Technology and Space Utilisation: aerothermodynamics and plasma engineering
Master's Thesis: Laboratory for Advanced Simulation of Turbulence (LAST), Tsinghua University, Beijing (China). *Effects of Thermal Non-Equilibrium on Hypersonic Boundary-Layer Transition*. Supervisors: Prof. S. Fu, Dr. M. Kloker
- 10/2012–4/2016 **B.Sc. Aerospace Engineering**, *University of Stuttgart (DE)*, Grade: 1.5
Bachelor's Thesis: Institute of Space Systems, University of Stuttgart. *Optimum Design of the Intake for an Atmosphere-Breathing Electric Propulsion System*. Supervisors: Dr. F. Romano, Dr. T. Binder, Prof. G. Herdrich.

Experience

- 4/2019–3/2020 **Research Associate**, *Institute of Aerodynamics and Gas Dynamics, University of Stuttgart (DE)*
Specialization areas:
○ Research group 'Transition and Turbulence': Cross-Flow Transition Control in a Hypersonic Boundary Layer on an Elliptic Cone
○ Aerospace engineering faculty: freshman students mentoring programme
Supervisor: Dr. M. Kloker
- 1/2019–3/2019 **Student Research Assistant**, *Institute of Aerodynamics and Gas Dynamics, University of Stuttgart (DE)*
Research group 'Boundary Layers': Direct Numerical Simulation (DNS) of compressible turbulent boundary-layer flows. Supervisor: Dr. C. Wenzel
- 6/2016–6/2017 **Student Research Assistant**, *Institute of Space Systems, University of Stuttgart (DE)*
Research group 'Electric Propulsion/Numerical Modelling and Simulation': Atmosphere-Breathing Electric Propulsion (EU-Project: DISCOVERER – DISruptive teChnOlogies for VERy low Earth oRbit platforms). Supervisors: Dr. F. Romano, Dr. T. Binder.
- 4/2015–8/2015 **Internship**, *MAHLE Behr GmbH & Co. KG, Stuttgart*
Subject-related internship in Thermal Engineering (Corporate Advanced Engineering):
○ Design of an anti-icing heat exchanger for heat pump
○ Thermal management of cooling plates for lithium-ion batteries

- 9/2010– AFS (American Field Service) Intercultural Programs, school-based exchange programme
7/2011 in Ingolstadt (Germany).
- 6/2009– AFS (American Field Service) Intercultural Programs, summer programme in Nagoya
8/2009 (Japan): japanese language course.

Latest publications

- 2025 P. C. Boldini, R. Hirai, P. Costa, J. W. R. Peeters, and R. Pecnik. *CUBENS: A GPU-accelerated high-order solver for wall-bounded flows with non-ideal fluids*. Computer Physics Communications, 309, 109507 (2025).
- 2024 P. C. Boldini, B. Bugeat, J. W. R. Peeters, M. Kloker, and R. Pecnik. *Transient growth in diabatic boundary layers with fluids at supercritical pressure*. Physical Review Fluids, 9, 083901 (2024).
- 2024 B. Bugeat, P. C. Boldini, A. M. Hasan, and R. Pecnik. *Instability in strongly stratified plane Couette flow with application to supercritical fluids*. Journal of Fluid Mechanics, vol. 984, A31 (2024).

for more publications, see:  Google Scholar Profile,  Researchgate

Teaching & Supervision

- 9/2024– Advanced Heat Transfer (ME45001), M.Sc. course Mechanical Engineering at Delft Uni-
11/2024, versity of Technology: teaching assistant for weekly instruction and assignments
9/2023–
11/2023
- 2024 Supervision Master's Thesis: F. Ramalho Matias, *Three-Dimensional Linear Stability Analysis of Flat-Plate Boundary Layers with Supercritical Fluids*.
- 2023 Supervision Master's Thesis: R. Gaspar, *Investigation of the transition to turbulence on a flat-plate boundary layer at supercritical pressure*.
- 2022 Supervision Master's Thesis: P. Molahalli, *Secondary Flows in Asymmetrical Contractions*.

Languages

Italian	Native	
German	Full Professional Proficiency	<i>TestDaF 4-4-4-4, 2011</i>
English	Full Professional Proficiency	<i>IELTS Band 7, 2014</i>
Dutch	Professional Working Proficiency	
Chinese	Elementary Proficiency	<i>Chinese 2 Blended Learning (A1/A2), 2017</i>

Computer Skills

Software	Matlab, NVIDIA Nsight Systems, GitHub, OpenFOAM, Catia V5, COMSOL Multiphysics, Microsoft Office
Programming	Fortran, Python, C++, CUDA, Shell
OS	Mac OS X, Windows, Linux
Text Processing	L ^A T _E X

Awards

- 2018 DAAD Master's Thesis scholarship at Tsinghua University, Beijing.
- 2014 Top Performer Award in Astronautics I, ranking in the top 5% of 111 participants, B.Sc. Aerospace Engineering.

Delft, March 2, 2025.