M.Sc. Pietro Carlo Boldini

Curriculum Vitae

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, 10/2017–2/2018 **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

9/2010–7/2011 AFS (American Field Service) Intercultural Programs, school-based exchange programme in Ingolstadt (Germany).

6/2009–8/2009 AFS (American Field Service) Intercultural Programs, summer programme in Nagoya (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

9/2024–11/2024, 9/2023–11/2023 Advanced Heat Transfer (ME45001), M.Sc. course Mechanical Engineering at Delft University of Technology: teaching assistant for weekly instruction and assignments

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	*TestDaF 4-4-4-4, 2011*
English	Full Professional Proficiency	*IELTS Band 7, 2014*
Dutch	Professional Working Proficiency	
Chinese	Elementary Proficiency	*Chinese 2 Blended Learning (A1/A2), 2017*

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	LaTeX

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.