

Fabio Beltrame

PhD in Propulsion & Power Systems

Aerospace engineer | Thermal and fluid dynamics



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R&D engineer with 6+ years of experience in modeling, design, optimization, and simulation of advanced power & propulsion systems. Specialized in thermal systems, fluid dynamics, and power generation (fuel cell, combined cycles, thermal energy harvesting, ...). Proven ability to deliver solutions across the TRL scale, supported by peer-reviewed [publications](#) & results obtained in collaboration with industry-leading companies. Experience in the coordination and management of research teams with proven success records.

HARD SKILLS

System modeling & analysis	Data analysis & post processing	Machine Learning
Thermal-hydraulic analysis	Software development	CFD RANS simulations
Heat exchanger design	Object-oriented programming	Shape optimization
Integrated optimization	Steady-state & dynamic models	Non-ideal fluid dynamics
Thermodynamic cycles	Data-driven models and regression	Data acquisition

SOFTWARE

Windows & Linux OS, MS Office package, LaTeX/Overleaf, Inkscape, ImageJ, Techplot.

MATLAB, Simulink-Simscape, Dymola, DaVis, EchTherm, Ansys Fluent, Ansys CFX, IBM SPSS.

Python + data science packs (Tensorflow, Keras, sci-kit learn) C/C++ , R , Modelica.

Work experience

POST DOCTORAL RESEARCHER

2025 – PRESENT

FPT Department, Delft University of Technology, The Netherlands

- Integrated design and optimization of the Air Supply system for a next-gen high-efficiency full-electric multi-MW propulsion system powered by fuel cells, for regional aircraft applications (Partners: Airbus, Liebherr)
- Thermal management system design for a Hydrogen Fuel Cell-Electric Power Train aircraft demonstration (partners: Honeywell, Fraunhofer, Pipistrel, NLR)

R&D ENGINEER / PHD CANDIDATE

2020 – 2025

FPT Department, Delft University of Technology, The Netherlands

- Multi-objective optimization of advanced Propulsion & Power systems: modeling and optimal design methods, on/off design analysis, validation. Research part of the ARENA project (Main partners: Safran, Airbus, MTU, NASA, NLR, AKG, Aeronamic).
- Software development: Heat exchanger design optimization methods, airborne cooling systems, ram air duct modelling and optimization, thermal system on/off design analysis.

- RANS CFD simulations, porous media modelling for heat exchanger simulation, optimization methods, verification & validation.
- Communication, project & stakeholder management: Presented at international conferences and stakeholders' meetings, produced technical reports & software docs, coordinated & supervised 5+ M.Sc. research projects, support and guidance for the TMS design of a hydrogen-powered aircraft by [AeroDelft](#).

POSTGRADUATE RESEARCHER

2019 – 2020

FPT Department, Delft University of Technology, The Netherlands

- Software development (Matlab) for the analysis and experimental data processing of dense organic vapor non-ideal supersonic expansions: Steady state analysis, transient identification, Mach line detection algorithms and flow feature extraction.
- Schlieren images acquisition (DaVis, ImageJ), pressure and temperature measurements, ESI & UQ, validation of CFD software using the [ORCHID](#) test rig.

SHIP DYNAMICS AND PERFORMANCE MANAGER

2017 – 2020

Polito Sailing Team, Polytechnic of Turin, Italy

- Management of the Dynamics research team (6+ researchers) and coordination of the scientific research areas of the team (20+ researchers), leading to 2 consecutive podium placements in a European competition.
- Software development: sailing yacht dynamics and performance evaluation software (Matlab & Simulink).
- Design of experiments and data acquisition (composite material property tests, fluid dynamics drag and lift characterization, data acquisition of the dynamic response of the yacht).

Education

M.Sc. AEROSPACE ENGINEERING

2017 – 2020

Polytechnic of Turin, Italy

Grade: 110L/110 With Honors + Pegasus Award (special achievements due to R&D project abroad)

Thesis: *Accuracy assessment of the SU2 flow solver for non-ideal organic vapor supersonic expansions using experimental data* ([published](#))

Key Courses: gas dynamics, space propulsion, advanced aerospace propulsion systems, design of aeroengines, CFD for turbomachinery, unsteady aerodynamics, experimental fluid dynamics.

Projects: Design of a military turbofan engine & control system, design of an ultra-long-haul transonic civil aircraft

B.Sc AEROSPACE ENGINEERING:

2014 – 2017

Polytechnic of Turin, Italy

Selection of Publications [\(Full list available here\)](#)

- “Optimal Design of Aircraft Thermal Systems and Their Heat Exchangers Leveraging a Data-Driven Surrogate Model”, **F. Beltrame**, P. Colonna, C.M. De Servi, *Int. J. of Heat and Mass Transfer*, 2025
 - “Optimal design of a ram air cooling duct housing the condenser of an ORC waste heat recovery unit”, **F. Beltrame**, L.J. Van Dongen, P. Colonna, C.M. De Servi, *Global Propulsion & Power Society conference proceedings*, Chania, Sept 2024
 - “Impact of the working fluid in ORC-based waste heat recovery systems for turboshaft engines”, F. Sinopoli, R. Caradente, L. Schulz, D. Krempus, **F. Beltrame**, C.M. De Servi, P. Nachtigal, D. Mimic, P. Colonna, M.Pini, *Global Propulsion & Power Society conference proceedings*, Chania, Sept 2024
 - “Organic Rankine Cycle waste heat recovery system for the turbofan engines of a partial-turboelectric aircraft”, D. Krempus, **F. Beltrame**, C.M. De Servi, R. Vos, P. Colonna, *Journal of Propulsion & Power*, Submitted, 2025
 - “Reduced order modelling of optimized HXs for maximum mass-specific performance of airborne ORC WHR units”, **F. Beltrame**, D. Krempus, P. Colonna, C.M. De Servi, *7th Int. seminar on ORC power systems proceedings*, Seville, Sept 2023
 - “Organic Rankine Cycle waste heat recovery system for aircraft auxiliary power units”, D. Krempus, **F. Beltrame**, C.M. De Servi, R. Vos, P. Colonna, *Journal of Global Propulsion & Power Society*, In press, 2024
 - “First experiments and commissioning of the ORCHID nozzle test section”, **F. Beltrame**, A.J. Head, C.M. De Servi, M. Pini, F.F.J. Schrijer, P. Colonna, *International seminar on Non-Ideal Compressible Fluid Dynamics for Propulsion & Power*, ERCOFTAC Series, Springer 2021
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LANGUAGES:

Italian (Native, full professional proficiency), **English** (Native-level, full professional proficiency), **Spanish** (A2)

PERSONALITY, ACTIVITIES & INTERESTS:

I strive both in teams and individual research roles due to my extensive experience in (i) large research teams, (ii) small research groups, and (iii) leading and organizing individual or team-based research projects. I am passionate about technology, machine learning, physics, and the environment. The sports I regularly practice (skiing, scuba diving, sailing, climbing, tennis, and volleyball) taught me discipline, hard work, safety precautions, and technical organization. I study music and love playing the guitar, bass guitar, and drums. I also hold a 2-star CMAS international diving certification with 3 specializations.

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