

Fabio Beltrame

PhD in Propulsion & Power Systems | Aerospace engineering |
Senior thermal & power systems engineer



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[LinkedIn](#) • [RG](#) • [Web site](#)

R&D engineer with a PhD in aerospace engineering and 6+ years of experience in complex system modeling, design optimization, simulation, and analysis of thermal, power, and propulsion systems. With a background in thermodynamics and fluid dynamics, I specialize in heat transfer, thermodynamic cycles, fuel cell systems, hybrid propulsion, and power generation. Proven ability to deliver groundbreaking solutions across the TRL scale supported by peer-reviewed [publications](#) and results obtained via cross-functional collaboration with industry-leading companies. Successful track record of project management of specialized, dynamic (agile) teams.

Work experience

2025 – PRESENT: R&D ENGINEER / POST-DOCTORAL RESEARCHER

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)

2020 – 2025: R&D ENGINEER / PHD CANDIDATE

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](#).

2019 – 2020: POSTGRADUATE RESEARCHER

FPT Department, Delft University of Technology, The Netherlands

- Developed software for the analysis and processing of experimental data of dense organic vapor non-ideal supersonic expansions. Detected steady state & transient conditions from experimental data, developed new algorithms for flow feature extraction from schlieren images, and performed CFD software validation using the [ORCHID](#) test rig results.

2017 – 2020: SHIP DYNAMICS & PERFORMANCE AREA MANAGER

Polito Sailing Team, Polytechnic of Turin, Italy

- Management of the Dynamics research team (6+ researchers) + 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

2017 – 2020: M.Sc. AEROSPACE ENGINEERING

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

2014 – 2017: B.Sc. AEROSPACE ENGINEERING

Polytechnic of Turin, Italy

HARD SKILLS

System modeling & analysis	Data analysis & post processing	Machine Learning
Data-driven models & regression	Software development	CFD
Heat exchanger design	Object-oriented programming	Shape optimization
Integrated optimization	Thermodynamic cycles	Non-ideal fluid dynamics

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.

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

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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