

**PERSONAL
INFORMATION**

ERNESTO SOZIO

Senior Propulsion Aerodynamics Engineer



SUMMARY

Senior Propulsion Aerodynamics Engineer with in-depth experience in axial turbine design and CFD optimization for industrial, aeronautical, and space applications, who lived and worked in 4 countries during the last 13 years. Expert of turbomachinery design (especially of axial gas turbines: subsonic, supersonic, partial admission), supersonic bell-shaped and aerospike. Recognized for his strong expertise in the field of propulsion and turbomachinery aerodynamics, with very good technical and analytical skills, always prone to improve new design methodologies. Author of 3 patents and several papers in the field of aerospike and gas turbine aerodynamics. Awarded multiple times for exceptional performance displayed at work. Strongly results-driven and creative problem solver, well able to work under pressure and capable of delivering on time and quality. Team player naturally fitting into international and multicultural environments, with an extrovert personality promoting an inclusive workplace.

WORK EXPERIENCE

01/03/2024 – PRESENT

Senior Propulsion Aerodynamics Engineer

Pangea Aerospace, Propulsion Department.

Barcelona, SPAIN.

Main activities and responsibilities:

- Company focal point of propulsion aerodynamics activities, with special focus on turbines, pumps, supersonic nozzles, and aerospike engines.
- Project leader of several turbopump design projects, including manufacturing and experimental campaigns.
- Project leader of the design of an aerospike engine, with special focus on aerodynamic analysis, introduction of new design methodologies, and performance improvement features.
- Internal reviewer of the fluid dynamics design of pumps and turbines for Liquid Rocket Engine (LRE) applications.
- Developer of an in-house code for the detailed aerodynamics design of partially admitted, supersonic, axial turbines.
- Technical contact with universities for all the research activities associates with turbomachinery and aerospike engines, involving dissemination through conferences and relevant scientific journals.

Business or sector: Space – Research and Development.

**02/05/2022 – 29/02/2024 Turbomachinery Fluid Dynamics Engineer
Pangea Aerospace, Propulsion Department.**

Barcelona, SPAIN.

Main activities and responsibilities:

- Leader of the aerodynamic design of supersonic turbines for Liquid Rocket Engine (LRE) applications.
- Supervisor of all the fluid dynamics design activities related to the LRE turbomachinery design, including inducers and centrifugal pumps.
- Responsible for the turbopump test stand designs.
- Leader of the Aerodynamic Technical Community, and responsible for the company design practices and standardization of all the aerodynamic design methodologies for turbopumps and aerospike engines.

Business or sector: Space – Research and Development.

**01/02/2016 – 30/04/2022 Turbine Aerodynamic Lead Engineer
GE – Avio S.r.l., Advanced Technology Operations (ATO) Department.**

Rivalta di Torino, ITALY.

Main activities and responsibilities:

- Member of the aero design team of GE Avio Aero very first High Pressure Turbine (HPT) for business and general aviation turboprop market (GE-Catalyst), and responsible for the related Vane-1 cooled Flow Function tests.
- Focal for Aerodynamic preliminary design exploration of innovative Low Pressure Turbines (LPTs), aiming at providing disruptive configurations to identify next generation commercial aviation LPT architectures for narrow body aircraft.
- Aero focal for the GENx 1B/2B service (the GE engines that power the Boeing 787 Dreamliner and Boeing 747-8 aircraft) to support non-conformance evaluations, cost out activities, producibility improvements, and field issues.
- Aero focal for several Turbine Rear Frames (TRFs) aerodynamic design, and responsible for the GE-Affinity TRF.
- Authorship of GE Aviation Design Practice: “Turbine Airfoil Design”.
- Main author and co-author of 3 patents filed, contributing to IP strategy for GE Aviation competitive advantage.
- Involved in cascade test activities to validate advanced aerodynamic design features.
- Global Turbine Aero Tech Community focal point for GE Avio Aero.

Business or sector: Aviation – Research and Development.

**01/02/2015 – 31/12/2015 Turbine Aerodynamic Design and Performance Engineer
ALSTOM (Switzerland) LTD. Gas Turbine Integration Department (GSTRT).**

Baden, SWITZERLAND.

Main activities and responsibilities:

- Responsible for validation and analysis of industrial diffusers performance field data, and definition of the related boundary conditions for CFD calculations at different load cases.
- Sensitivity studies for mesh sizes and turbulence models.

Business or sector: Industrial Gas Turbine – Research and Development.

**15/10/2012 – 31/01/2015 Development Engineer Thermals
ALSTOM (Switzerland) LTD. Gas Turbine Integration Department (GSTRD).**

Baden, SWITZERLAND.

Main activities and responsibilities:

- Thermal analysis by means of Rolls-Royce aero-engine technology (SC03) for the calculation of engine component temperatures to support mechanical design and lifetime assessments.
- Interaction with other technical units for the creation of the thermal Whole Engine Model (WEM) of the full engine.
- Unsteady CFD calculations.

- Coupling fluid (CFD) and structural (FE) models.

Business or sector: Industrial Gas Turbine – Research and Development.

26/09/2011 – 26/10/2011 **Research Mechanical engineer**
POLITECNICO DI BARI, faculty of Mechanical Engineering.
 Bari, ITALY.

Main activities and responsibilities: Development of an algorithm for calculating velocities and streamlines on a blade-to-blade stream surface of a turbomachinery.

Business or sector: Computational Fluid Dynamics.

SKILLS

NATIVE LANGUAGE ITALIAN

OTHER LANGUAGES

ENGLISH

SPANISH

GERMAN

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Interaction	Production	
C2	C2	C2	C2	C2
B2	B2	B1	B1	A2
A1	A1	A1	A1	A1

Levels: A1/2 = Basic user – B1/2 = Independent user – C1/2 = Proficient user

[Common European Framework of Reference for Languages](#)

COMPUTER SKILLS

- **O/S:** Windows, LINUX.
- **Other:** Microsoft Office programs (Word, Excel and PowerPoint).
- **Programming:** Visual Basic, Matlab, Fortran, Python.
- **CAD:** Siemens NX.
- **Others:** Cadence, AxSTREAM, Ansys Fluent, CFX, SC03, and all the GE-Avio in-house Aero design programs and CFD analysis.

EDUCATION AND QUALIFICATIONS

03/10/2011 – 21/09/2012 **Post-Graduate Research Master in Fluid Dynamics – Turbomachinery and Propulsion Department (turbine specialization)**

VON KARMAN INSTITUTE FOR FLUID DYNAMICS.

Rhode-St-Genèse, BELGIUM.

Project title: “Design-Optimization Process of Innovative Axial Turbines” (*Paper presented and published at ASME Turbo Expo 2013, San Antonio, Texas, USA.*)

Graduation mark: **HONOURS.**

Main subjects: Differential equations of Fluid Dynamics – Numerical methods in Fluid Dynamics – Flow in Turbomachinery – Advanced course on Turbines.

27/04/2011 **MSc in Mechanical Engineering, curriculum of machinery and propulsion**

POLITECNICO DI BARI, faculty of Mechanical Engineering.

Bari, ITALY.

Thesis title: “Analysis of wall models for turbulent flow simulation”.

Graduation mark: **110/110 CUM LAUDE.**

Main subjects: Fluid machinery – Turbomachinery – Computational Fluid Dynamics – Aerospace propulsion – Gas dynamics – Turbulence – Modelling and simulation of power plants – Internal combustion engines – Hydraulics.

15/02/2007 **BSc in Mechanical Engineering**

POLITECNICO DI BARI, faculty of Mechanical Engineering.

Bari, ITALY.

Thesis title: “Simulation of the flow in a centrifugal pump”.

Graduation mark: **101/110**.

Main subjects: Thermodynamics and heat transfer – Fluid dynamics – Rational mechanics and applied mechanics – Mechanical behaviour of materials and mechanical design – Manufacturing engineering and technology.

JOURNALS AND CONFERENCES

03/2025 Paper published in a Journal

L. Fadigati, **E. Sozio**, F. Rossi, N. Souhair, F. Ponti. “*Advanced Aerodynamic Analysis of the Supersonic Flow Field of an Aerospike Engine*”. Aerospace Science and Technology, Volume 158, March 2025, 109908.

<https://doi.org/10.1016/j.ast.2024.109908>

15/11/2024 Paper published in a Journal

N. Monokrousos, L. Könözy, V. Pachidis, **E. Sozio**, F. Rossi. “*A numerical approach to overcome the very-low Reynolds number limitation of the artificial compressibility for incompressible flows*”. Heliyon, Volume 10, Issue 21, e39587, November 15, 2024.

<https://doi.org/10.1016/j.heliyon.2024.e39587>

09-13/09/2024 Paper published at ICAS Conference

N. Monokrousos, L. Könözy, V. Pachidis, **E. Sozio**, F. Rossi. “*Numerical Solution Of Lox Flow In A Liquid Rocket Engine Additively Manufactured Cooling Channel*”. ICAS PAPER 2024_0105. ICAS 2024 Conference, 09 – 13 September 2024, Florence, Italy.

https://www.icas.org/ICAS_ARCHIVE/ICAS2024/data/papers/ICAS2024_0105_paper.pdf

30-31/05/2024 Paper published at microCAD International Multidisciplinary Scientific Conference

N. Monokrousos, L. Könözy, V. Pachidis, **E. Sozio**, F. Rossi. “*Temperature-Dependent Solid Material Properties Of Grcop-42 For An Additively Manufactured Liquid Rocket Engine Lox Cooling Channel*”. MultiScience - microCAD International Multidisciplinary Scientific Conference - Special Issue Part II, Vol. 14 No. 3 (2024), 30 – 31 May 2024, University of Miskolc.

<https://ojs.uni-miskolc.hu/index.php/multi/article/view/3186/2500>

<https://doi.org/10.35925/j.multi.2024.3.9>

20-23/05/2024 Paper published at Space Propulsion Conference

L. Fadigati, F. Rossi, **E. Sozio**, N. Souhair, F. Ponti. “*Aerospike Performance Evaluation at Different Ambient Pressures*”. Space Propulsion 2024. SP2024 540. 20 - 23 May 2024, Glasgow, Scotland.

[https://www.3af-](https://www.3af-spacepropulsion.com/images/DOCUMENTS/SP2024_PRELIMINARY_PROGRAMME.pdf)

[spacepropulsion.com/images/DOCUMENTS/SP2024_PRELIMINARY_PROGRAMME.pdf](https://www.3af-spacepropulsion.com/images/DOCUMENTS/SP2024_PRELIMINARY_PROGRAMME.pdf)

03-07/06/2013 Paper published at ASME Conference

E. Sozio, T. Verstraete, G. Paniagua. “*Design-Optimization Approach to Multistage Axial Contra-Rotating Turbines*”. Proceedings of ASME Turbo Expo 2013. GT2013-94762. San Antonio, Texas, USA. DOI: 10.1115/GT2013-94762.

<https://asmedigitalcollection.asme.org/GT/proceedings-abstract/GT2013/55232/V06BT37A016/245515>

PATENTS

20/02/2024 Patent Granted

A. Buonvino, L. Giacobone, D. Coutandin, **E. Sozio**, F. Bertini. “*Turbine Engine Component*”

With A Set Of Deflectors”.

Pub. No.: US 11,905,853 B2 Appl. No.: 17/228,778

<https://patentimages.storage.googleapis.com/d6/78/e7/198ad43617fbac/US11905853.pdf>

21/11/2023 Patent Granted

M. Airaudo, P. Calza, F. Bertini, M.R. Usseglio, C. Lizzer, **E. Sozio**, M. Furfaro, M. Thiene. *“Turbine Blades Including Aero - Brake Features And Methods For Using The Same”.*

Pub. No.: US 11,821,334 B2. Appl. No.: 17/338,143

<https://patentimages.storage.googleapis.com/55/20/be/4af17c86b64db6/US11821334.pdf>

06/09/2022 Patent Granted

E. Sozio, F. Bertini, J.D. Clements, J. Ong, L.D. Dailey, P.H. Vitt, M.R. Usseglio. *“Turbine Engine With Airfoil Having High Acceleration And Low Blade Turning”.*

Pub. No.: US 11,434,765 B2. Appl. No.: 17/148,635

<https://patentimages.storage.googleapis.com/3d/c7/40/6df962b204380f/US11434765.pdf>

AWARDS

16/12/2021 GE Impact Award

Reason: *“Congratulations and thank you for your authorship of GE Aviation Design Practice ‘Turbine Airfoil Design’. On behalf of the DB4 Leadership Team and Chief Engineer’s Office, I thank you for your efforts, dedication, and expertise in writing this Design Practice. This DP not only documents your knowledge and the knowledge of our business but allows us to pass it and leverage on for productive use in the future for the benefit of our customers and our business.”*

12/12/2018 GE Impact Award

Reason: *“The innovative LPT architecture tested will enable a leap in efficiency, product cost and engine accessibility, representing one of the key systems for next generation narrow body engines. [...] The team succeeded in designing, procuring, and testing two different sub-scale turbines configurations with a FastWorks approach, in a global collaborative environment.”*

06/09/2016 GE Bronze Award

Reason: *“Deliver results in an uncertain world. The ATP GGT is the first aero design of an HPT for a NPI program done in AvioAero and in general in GEA, outside US. The aerodynamic design team successfully completed the aero reviews and made an impressive amount of work in a very short term to come out with successful design in a context where the engine definition is still evolving, requiring continuous loops and iteration to optimize the design. [...] A significant demonstration of systems mindset by the team.”*

RECENT TRAININGS

24/04/2023 Design of Space Launch Vehicles – AIAA Course

This 33-hour comprehensive course focuses on the application of numerous engineering disciplines to the design and analysis of launch vehicles, including many practical applications not found elsewhere.

Instructor: Don Edberg, Professor of Aerospace Engineering at Cal Poly Pomona & Adjunct Lecturer, Astronautical Engineering, University of Southern California (USC).

28/04/2022 Turbomachinery for Emerging Space Applications: Liquid Rocket Propulsion – AIAA Course

This 24-hour course covers an introduction to the interdisciplinary design of turbomachinery

components within their corresponding systems in the context of liquid rocket engines.
Instructors: Mr. Clement Joly, Senior Manager at SoftInWay. Dr. Vlad Goldenberg, Engineer at SoftInWay.

I hereby authorize the use of my personal data in accordance to the GDPR 679/16 - "European regulation on the protection of personal data".