PERSONAL INFORMATION Vincenzo Barbato

Rome, Italy

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EDUCATION AND TRAINING

2023 – Present PhD in Aeronautical and Space Engineering (39th Cycle)

Sapienza University of Rome, Rome, Italy
Italian Space Agency (ASI), Rome, Italy

– Numerical research on high-thrust, high-specific-impulse propulsion systems for human space exploration, with primary focus on Nuclear Thermal Propulsion
– Integrated mission analysis and system-level modelling coupled with neutronics and conjugate heat transfer numerical simulations
– Secondary research activities on aerospike nozzle performance and continuous work on regenerative cooling systems and heat transfer in rocket engines

2020 – 2022 Master's Degree in Space and Astronautical Engineering (LM-20)

Sapienza University of Rome, Rome, Italy

– Merit-based scholarship "Outstanding Student"
– Teaching assistantship for tutoring activities in Mathematical Analysis and Geometry
– Master's thesis in Rocket Propulsion
  Supervisor: Prof. Francesco Nasuti
  Title: *"Conjugate Heat Transfer Applied to Transient Analysis for Rocket Engine Cooling Systems Design"*
– Results presented at international conferences and further developed into indexed conference publications
– Final grade: 110/110 cum laude

2017 – 2020 Bachelor's Degree in Aerospace Engineering (L-9)

Sapienza University of Rome, Rome, Italy

– Merit-based scholarship "Outstanding Student"
– Participation in the "Percorso di Eccellenza" excellence programme in Mathematics and Chemistry
– Bachelor's thesis in Space Flight Mechanics
  Supervisor: Prof. Alessandro Zavoli
  Title: *"Optimization of Interplanetary Trajectories Using Reinforcement Learning"*
– Research contributed to ongoing studies in interplanetary trajectory optimization within the research group
– Final grade: 110/110 cum laude

2012 – 2017 Scientific High School Diploma

Liceo Scientifico Vito Volterra, Ciampino (Rome), Italy

– Final grade: 100/100

2006 – 2009 Primary School

Prague British School (PBS), Prague, Czech Republic

– International school with English as the language of instruction

WORK EXPERIENCE

2024 – Present — ### Industrial Research Contracts in Space Propulsion

Sapienza University of Rome, Rome, Italy
Collaboration with Avio S.P.A. and FinisTerrae S.R.L.

- Performed targeted numerical modeling to support the design of liquid-propellant rocket engines
- Conducted numerical simulations of test environments to reproduce, analyze, and post-process experimental results

Jul 2023 – Oct 2023 — ### Research Fellow

Sapienza University of Rome, Rome, Italy
Sapienza Aerospace Research Centre (CRAS)

- Developed and implemented numerical models for transient analysis of liquid-propellant rocket engines
- Performed system-level simulations in EcosimPro, with emphasis on two-phase flow behaviour
- Supported research on performance and thermal analysis of regeneratively cooled propulsion systems

Oct 2022 — ### Professional Training Internship – Exercise "Mare Aperto 22"

Italian Navy – Naval Units

- Served for one month as Aerospace Engineer onboard the aircraft carrier *Cavour* during the 2022 "Mare Aperto" military exercise, supporting operational and technical activities

PUBLICATIONS AND CONFERENCE CONTRIBUTIONS

Journal Publications

- *Impact of Module Design on the Performance of Clustered Aerospike Nozzles for Upper Stage Applications* - Matteo Fiore, **Vincenzo Barbato**, Daniele Bianchi, Francesco Nasuti - Journal of Aerospace Science and Technology, 2025 - DOI: `https://doi.org/10.1016/j.ast.2025.111164`

Conference Contributions

- *Effects of Inhomogeneous Power Distribution on Nuclear Thermal Rocket Propulsion* - **Vincenzo Barbato**, Marco Pizzarelli, Francesco Nasuti - EUCASS, 2025
- *Modular Aerospike Nozzles for Upper Stage Applications* - Matteo Fiore, **Vincenzo Barbato**, Carlo Patti, Daniele Bianchi, Francesco Nasuti - EUCASS, 2025
- *Performance Analysis of Aerospikes with Clustered Non-Conventional Modules* - Matteo Fiore, **Vincenzo Barbato**, Daniele Bianchi, Francesco Nasuti - AIAA SciTech Forum, 2025 - DOI: `https://doi.org/10.2514/6.2025-2287`
- *Progresses in Applied Research on Liquid Rocket Propulsion by T(H)RUST Research Team at Sapienza University of Rome* - Francesco Nasuti, Daniele Bianchi, Mario Tindaro Migliorino, Marco Grossi, Matteo Fiore, Marco Rotondi, Paolo Maria Zolla, Beatrice Latini, Marco Fabiani, Gianluca Cocirla, Alessio Sereno, Alessandro Montanari, **Vincenzo Barbato** - IAC, 2024 - DOI: `https://dx.doi.org/10.52202/078371-0001`
- *Module Performance and Heat Transfer Analysis of a Clustered Annular Aerospike Nozzle* - **Vincenzo Barbato**, Alessio Sereno, Matteo Fiore, Francesco Nasuti - Space Propulsion Conference, 2024
- *Transient Analysis of Liquid Rocket Engine Chilldown and Startup by Conjugate Heat Transfer Approach* - Matteo Fiore, **Vincenzo Barbato**, Francesco Nasuti - AIAA SciTech Forum, 2024 - DOI: `https://doi.org/10.2514/6.2024-0353`
- *T(H)RUST: Applied Research Activities on Liquid Rocket Propulsion at Sapienza University of Rome* - Francesco Nasuti, Daniele Bianchi, Mario Tindaro Migliorino, Marco Grossi, Matteo Fiore, Marco Rotondi, Paolo Maria Zolla, Beatrice Latini, Marco Fabiani, Gianluca Cocirla, Alessio Sereno, Alessandro Montanari, **Vincenzo Barbato** - IAC, 2023
- *Conjugate Heat Transfer Applied to Transitory Analysis for Rocket Engine Cooling Systems Design* - **Vincenzo Barbato**, Matteo Fiore, Francesco Nasuti - AIDAA, 2023 - DOI: `https://doi.org/10.21741/9781644902813-45`

PROFESSIONAL TRAINING AND WORKSHOPS

- Space Nuclear Power and Propulsion Technologies (Joint Workshop ESA–UKSA), ESA-ECSAT (Harwell, United Kingdom), 4–5 June 2025
- IP-CCI: Innovative Propulsion Cross-Cutting Initiatives, ESA-ESTEC (Attended Online), 26–27 May 2025
- IP-CCI: Innovative Propulsion Cross-Cutting Initiatives, focus on Nuclear Propulsion Technologies, ESA-ESTEC (Noordwijk, Netherlands), 22–23 March 2024

TEACHING AND OUTREACH

- Co-supervision of Master's degree theses in Space and Astronautical Engineering at Sapienza University of Rome
- Technical mentoring and co-supervision of academic theses developed in collaboration with the Italian Space Agency (ASI)
- University teaching contributions: supervision of exercises for the "Liquid Rocket Engines" course and assistance in examinations for the "Rocket Propulsion" course (Sapienza University of Rome)
- Selected for the PNRR "Orientamento Next Generation" programme at Sapienza University of Rome for two consecutive years (2024, 2025); delivered orientation and guidance activities in scientific high schools to support students' academic and career choices
- University tutoring in Mathematical Analysis and Geometry (Sapienza University of Rome, 2022–2023)
- Private tutoring in Mathematics and Physics at high-school and university level (2017–Present)

SKILLS

Languages

- Italian: Native speaker
- English: C1 – Professional working proficiency

Programming Languages

- Linux, bash scripting
- MATLAB / Simulink, Python, Fortran

Scientific and Engineering Software

- In-house CFD solvers, Department of Mechanical and Aerospace Engineering, Sapienza University of Rome
- ECOSIMPRO for 1D system-level propulsion simulations
- Tecplot 360 for CFD post-processing and visualization
- Gmsh for mesh generation
- Basic knowledge of COMSOL, Abaqus, Solid Edge, DigiMat

ADDITIONAL INFORMATION

- Completed a 4-month course at the European Patent Office (EPO), "Create – Protect – Innovate: Bringing Ideas to Market (Entry Level)" [Course code: UV03-2025], including a final exam (2025-2026)
- Completed a 1-month advanced Human Intelligence (HUMINT) training course, "Tecniche Avanzate di Human Intelligence – Corso Operativo per l'Intelligence Istituzionale e Privata", VI Edition, delivered by the Istituto Gino Germani di Scienze Sociali e Studi Strategici, including a practical field exercise (2025)
- Completed the Forward Program by McKinsey & Company, a 10-week online professional development programme focused on structured problem-solving, communication, and career skills (2024)

Autorizzo il trattamento dei miei dati personali ai sensi del D.Lgs. 196 del 30 giugno 2003 e dell'art. 13 del GDPR.