Davide Cavalieri

europass

EDUCATION AND TRAINING

PhD candidate in Aeronautics and Space Engineering

Università degli Studi di Roma "La Sapienza" [January 2022 – December 2024]

Level in EQF : EQF level 8

National classification : Third Cycle

Conference Papers and Journal Publications:

- **D. Cavalieri**. Theoretical and Numerical Modeling of Multicomponent Transcritical Diffuse Interfaces Under LRE Conditions. *Aerotecnica Missili & Spazio* (102) 45-57 (2023). https://doi.org/10.1007/s42496-022-00136-3.
- **D. Cavalieri** et al. A Pressure-Based Numerical Framework for Highly Stratified Transcritical Real-Fluids Simulations. *AIAA SCITECH 2023 Forum* (2023). https://dx.doi.org/10.2514/6.2023-1666.
- **D. Cavalieri** et al. Unsteady RANS simulations with uncertainty quantification of spray combustor under liquid rocket engine relevant conditions. *AIAA SCITECH 2023 Forum* (2023). https://doi.org/10.2514/6.2023-2148.
- **D. Cavalieri** et al. Assessment of phase-separation phenomena in LREs cryogenic flows. *Aerospace Europe Conference 2023 – 10th EUCASS – 9th CEAS (2023)*.
- **D. Cavalieri** et al. Impact of non-ideal fluid modeling on droplet evaporation for aerospace applications. *10th Symposium on Turbulence, Heat and Mass Transfer* (2023). https://doi.org/10.1615/ichmt.thmt-23.880.
- **D. Cavalieri** and P. E. Lapenna. Pressure effects on turbulent pseudo-boiling rate. *10th Symposium on Turbulence, Heat and Mass Transfer* (2023). https://doi.org/10.1615/ichmt.thmt-23.1120.
- L. Lucchese, J. Liberatori, **D. Cavalieri** et al. Impact of chemical modeling on the numerical analysis of a LOx/GCH4 rocket engine pintle injector. *Acta Astronautica* (218) 240-250 (2024). https://doi.org/10.1016/j.actaastro.2024.02.038.
- L Lucchese, J. Liberatori, **D. Cavalieri** et al. Pintle Injector Performance Sensitivity to the Radial Injection Arrangement. *AIAA SCITECH 2024 Forum* (2024). https://doi.org/10.2514/6.2024-1393.
- M. Blandino, J. Liberatori, **D. Cavalieri** et al. Turbulence Closure Assessment in URANS of a Cold-Flow Lab-Scale Swirled Burner, *AIAA SCITECH 2024 Forum* (2024). https://doi.org/10.2514/6.2024-0591.
- D. Schintu, **D.Cavalieri** et al. Efficient multiphysics simulations of LRE combustion chambers using tabulated chemistry. *9th Edition of the 3AF International Space Propulsion Conference* (2024). hdl: 11573/1714467.
- J. Liberatori, **D. Cavalieri** et al. Large Eddy Simulations of Conventional and Alternative Aviation Fuel Spray Breakup, *AIAA Aviation 2024 Forum* (2024). https://doi.org/10.2514/6.2024-3689.
- A. Remiddi, P. E. Lapenna, **D. Cavalieri** et al. Data-driven modeling of resolved and filtered thermo-diffusively unstable hydrogen-air flames. *Proceedings of the Combustion Institute* (40) 105713 (2024). https://doi.org/10.1016/j.proci.2024.105713.
- **D. Cavalieri** et al. Evaluation of non-ideal fluid modeling for droplet evaporation in jet-engine like conditions. *Flow, Turbulence and Combustion* (2024) (Accepted for publication). https://doi.org/10.21203/rs.3.rs-4508461/v1.
- L Lucchese, J. Liberatori, **D. Cavalieri** et al. Effect of Radial Mass Flow Rate Partition on LOx/GCH4 Pintle Injector Configurations. *Journal of Propulsion and Power* (2024) (Accepted for publication).
- J. Liberatori, **D. Cavalieri** et al. BayeSAF: Emulation and Design of Sustainable Alternative Fuels via Bayesian Inference and Descriptors-Based Machine Learning. *Fuel* (2025) (submitted for publication).
- M. Blandino, J. Liberatori, **D. Cavalieri** et al. Multicomponent HyChem kinetic mechanism generation using Trust-Region Bayesian Optimazion. *13th Mediterranean Combustion Symposium* (2025) (submitted).

Work Experience:

- January 2022 - now
  Development of CFD combustion models within the OpenFOAM toolbox, AVIO S.p.A
  LOX/CH4 combustion characterization of a pintle-injector liquid rocket engine thrust chamber under subcritical conditions
  PI : Prof. M. Valorani

- January 2024 - now
  Development of liquid-phase thermodynamic and evaporation models within the OpenFOAM toolbox, AVIO S.p.A
  HTP-RP1 vaporization and combustion characterization of shear-coaxial LRE combustion chambers
  PI : Prof. P.P. Ciottoli

Teaching Activities:

- November 2023 - November 2024
  Tutor in Aerospace Propulsion
  Course in Bachelor's Degree in Aeronautical Engineering

- January 2022 - now
  Combustion Thesis Co-Supervisor
  Master's Degree in Aeronautical Engineering

Master's Degree in Space and Astronautical Engineering

Università degli Studi di Roma "La Sapienza" [2019 – 2021]

Final grade : 108/110 - **Level in EQF :** EQF level 7

National classification : Second Cycle

Thesis : Theoretical and numerical modeling of transcritical diffuse interfaces under LRE conditions. Advisor: Prof. F. Creta

Bachelor's Degree in Aerospace Engineering

Università degli Studi di Roma "La Sapienza" [2014 – 2018]

Final grade : 92/110 - **Level in EQF :** EQF level 6
National classification : First Cycle
Thesis : Design, construction and bench-testing of a Lab-Scale solid rocket motor
Advisor : Prof. D. Bianchi

High School Diploma (nuclear industrial engineer)

Istituto tecnico industriale G. Marconi [2008 – 2013]

Final grade : 94/100

LANGUAGE SKILLS

Mother tongue(s):

Italian

English

LISTENING: C1 **READING:** B2 **WRITING:** B1

SPOKEN PRODUCTION: B2

SPOKEN INTERACTION: B1

DIGITAL SKILLS

Working knowledge with the following OS: Mac, Windows, Unix-based / Programming skills in: Python, MATLAB,C++, Wolfram Mathematica / Working knowledge with the following CFD softwares: OpenFOAM, Ansys FLUENT / Converge Working knowledge with the following CAD softwares: Autodesk Fusion360 / Working knowledge with the following CFD post-processing softwares: Tecplot, ParaView / Working knowledge with the chemical kinetics software Cantera/ CEA

Il sottoscritto dichiara di essere consapevole che il presente *curriculum vitae* sarà pubblicato sul sito istituzionale dell'Ateneo, nella Sezione "Amministrazione trasparente", nelle modalità e per la durata prevista dal d.lgs. n. 33/2013, art. 15.

Roma, 13/12/2024