

Pasquale Eduardo Lapenna

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Current position

Assistant Professor in Aerospace Propulsion, Department Mechanical and Aerospace Engineering, Sapienza University of Rome

Areas of specialisation

Liquid Rocket Engines; Combustion Chambers, Injection and Mixing, Laminar and Turbulent Combustion; Cryogenic and high pressure Flows; Computational Fluid Dynamics and High Performance Computing

Appointments held

- 2016-2019 *Post-Doc Aerospace Propulsion*, Department Mechanical and Aerospace Engineering, Sapienza University of Rome
- 2019-2020 *Researcher*, Energy Efficiency Department, ENEA Italy
- 2020-2022 *Post-Doc Aerospace Propulsion*, Department Mechanical and Aerospace Engineering, Sapienza University of Rome

Habilitations

- 2020-2029 ASN (Abilitazione Scientifica Nazionale) National Scientific Qualification for associate professorship in Aerospace Propulsion.

Education

- 2008-2011 BSc Aerospace Engineering, Polytechnic University of Milan
- 2011-2013 MSc Space Engineering, Sapienza University of Rome
- 2013-2017 PhD in Aeronautical and Space Technology, Sapienza University of Rome

Grants, honours & awards

- 2013 Honours Programme in MSc Space Engineering, Sapienza University of Rome
- 2021 Best Paper Award in the Laminar Flames colloquia at the 38th International Combustion Symposium, *The effect of pressure on the hydrodynamic stability limit of premixed flames* by Attili, A., Lamioni, R., Berger, L., Kleinheinz, K., Lapenna, P.E., Pitsch, H., Creta, F.
- 2022 HPC-EUROPA-3 Project *Enabling practical DNS of real fluids for propulsion and power* at BSC Barcelona Super Computing Center

Teaching

2019-2022	<i>Aerospace Propulsion</i> , Adjunct Professor 3 CFU, BSc Aerospace Engineering, Sapienza University of Rome
2019-2022	<i>Theory and modelling of high pressure flows in propulsion systems</i> , 3 CFU, PhD in Aeronautical and Space Technology, Sapienza University of Rome
2018-2022	<i>Introduction to Turbulent Combustion Simulation</i> , 1 CFU, MSc Aeronautical and Space Engineering, Sapienza University of Rome
2016-2019	<i>Solid Rocket Motors</i> , Assistant, MSc Space Engineering, Sapienza University of Rome
2016-2021	<i>Combustion</i> , Assistant, MSc Space Engineering, Sapienza University of Rome

Publications

JOURNAL ARTICLES

- [21] Indelicato, G., Lapenna, P.E., Remiddi, A., Creta, F.
An efficient modeling framework for wall heat flux prediction in rocket combustion chambers using non adiabatic flamelets and wall-functions (2021) *International Journal of Heat and Mass Transfer*, 169, art. no. 120913. DOI: [10.1016/j.ijheatmasstransfer.2021.120913](https://doi.org/10.1016/j.ijheatmasstransfer.2021.120913)
- [20] Lapenna, P.E.
Thermodynamic small scales in transcritical turbulent jets (2021) *AIAA Journal*, 59 (6), pp. 1-5. DOI: [10.2514/1.J059664](https://doi.org/10.2514/1.J059664)
- [19] Lapenna, P.E., Berger, L., Attili, A., Lamioni, R., Fogla, N., Pitsch, H., Creta, F.
Data-driven subfilter modelling of thermo-diffusively unstable hydrogen–air premixed flames (2021) *Combustion Theory and Modelling*, 25 (6), pp. 1064-1085. DOI: [10.1080/13647830.2021.1925350](https://doi.org/10.1080/13647830.2021.1925350)
- [18] Lapenna, P.E., Lamioni, R., Creta, F.
Subgrid modeling of intrinsic instabilities in premixed flame propagation (2021) *Proceedings of the Combustion Institute*, 38 (2), pp. 2001-2011. DOI: [10.1016/j.proci.2020.06.192](https://doi.org/10.1016/j.proci.2020.06.192)
- [17] Lapenna, P.E., Troiani, G., Lamioni, R., Creta, F.
Mitigation of Darrieus-Landau instability effects on turbulent premixed flames (2021) *Proceedings of the Combustion Institute*, 38 (2), pp. 2885-2892. DOI: [10.1016/j.proci.2020.07.018](https://doi.org/10.1016/j.proci.2020.07.018)
- [16] Attili, A., Lamioni, R., Berger, L., Kleinheinz, K., Lapenna, P.E., Pitsch, H., Creta, F.
The effect of pressure on the hydrodynamic stability limit of premixed flames (2021) *Proceedings of the Combustion Institute*, 38 (2), pp. 1973-1981. DOI: [10.1016/j.proci.2020.06.091](https://doi.org/10.1016/j.proci.2020.06.091)
- [15] Benedetti, M., Dadi, D., Giordano, L., Introna, V., Lapenna, P.E., Santolamazza, A.
Design of a database of case studies and technologies to increase the diffusion of low-temperature waste heat recovery in the industrial sector (2021) *Sustainability*, 13 (9), art. no. 5223, . DOI: [10.3390/su13095223](https://doi.org/10.3390/su13095223)
- [14] Indelicato, G., Lapenna, P.E., Concetti, R., Caputo, M., Valorani, M., Magnotti, G., Creta, F.
Numerical Investigation of High Pressure CO₂-Diluted Combustion Using a Flamelet-based Approach (2020) *Combustion Science and Technology*, 192 (11), pp. 2028-2049. DOI: [10.1080/00102202.2020.1811243](https://doi.org/10.1080/00102202.2020.1811243)
- [13] Lamioni, R., Lapenna, P.E., Berger, L., Kleinheinz, K., Attili, A., Pitsch, H., Creta, F.
Pressure-induced Hydrodynamic Instability in Premixed Methane-Air Slot Flames (2020) *Combustion Science and Technology*, 192 (11), pp. 1998-2009. DOI: [10.1080/00102202.2020.1768081](https://doi.org/10.1080/00102202.2020.1768081)
- [12] Ciottoli, P.P., Lee, B.J., Lapenna, P.E., Malpica Galassi, R., Hernández-Pérez, F.E., Martelli, E., Valorani, M., Im, H.G.
Large Eddy Simulation on the Effects of Pressure on Syngas/Air Turbulent Nonpremixed Jet

- Flames (2020) Combustion Science and Technology, 192 (10), pp. 1963-1996. DOI: [10.1080/00102202.2019.1632300](https://doi.org/10.1080/00102202.2019.1632300)
- [11] Creta, F., Lapenna, P.E., Lamioni, R., Fogla, N., Matalon, M.
Propagation of premixed flames in the presence of Darrieus–Landau and thermal diffusive instabilities (2020) Combustion and Flame, 216, pp. 256-270. DOI: [10.1016/j.combustflame.2020.02.030](https://doi.org/10.1016/j.combustflame.2020.02.030)
- [10] Lapenna, P.E., Indelicato, G., Lamioni, R., Creta, F.
Modeling the equations of state using a flamelet approach in LRE-like conditions (2019) Acta Astronautica, 158, pp. 460-469. DOI: [10.1016/j.actaastro.2018.07.025](https://doi.org/10.1016/j.actaastro.2018.07.025)
- [9] Lapenna, P.E., Creta, F.
Direct numerical simulation of transcritical jets at moderate Reynolds number (2019) AIAA Journal, 57 (6), pp. 2254-2263. DOI: [10.2514/1.J058360](https://doi.org/10.2514/1.J058360)
- [8] Lapenna, P.E., Lamioni, R., Troiani, G., Creta, F.
Large scale effects in weakly turbulent premixed flames (2019) Proceedings of the Combustion Institute, 37 (2), pp. 1945-1952. DOI: [10.1016/j.proci.2018.06.154](https://doi.org/10.1016/j.proci.2018.06.154)
- [7] Lamioni, R., Lapenna, P.E., Troiani, G., Creta, F.
Strain rates, flow patterns and flame surface densities in hydrodynamically unstable, weakly turbulent premixed flames (2019) Proceedings of the Combustion Institute, 37 (2), pp. 1815-1822. DOI: [10.1016/j.proci.2018.06.196](https://doi.org/10.1016/j.proci.2018.06.196)
- [6] Lamioni, R., Lapenna, P.E., Troiani, G., Creta, F.
Flame Induced Flow Features in the Presence of Darrieus-Landau Instability (2018) Flow, Turbulence and Combustion, 101 (4), pp. 1137-1155. DOI: [10.1007/s10494-018-9936-0](https://doi.org/10.1007/s10494-018-9936-0)
- [5] Lapenna, P.E.
Characterization of pseudo-boiling in a transcritical nitrogen jet (2018) Physics of Fluids, 30 (7), art. no. 077106, . DOI: [10.1063/1.5038674](https://doi.org/10.1063/1.5038674)
- [4] Lapenna, P.E., Creta, F.
Mixing under transcritical conditions: An a-priori study using direct numerical simulation (2017) Journal of Supercritical Fluids, 128, pp. 263-278. DOI: [10.1016/j.supflu.2017.05.005](https://doi.org/10.1016/j.supflu.2017.05.005)
- [3] Lapenna, P.E., Ciottoli, P.P., Creta, F.
Unsteady Non-Premixed Methane/Oxygen Flame Structures at Supercritical Pressures (2017) Combustion Science and Technology, 189 (12), pp. 2056-2082. DOI: [10.1080/00102202.2017.1358710](https://doi.org/10.1080/00102202.2017.1358710)
- [2] Ciottoli, P.P., Malpica Galassi, R., Lapenna, P.E., Leccese, G., Bianchi, D., Nasuti, F., Creta, F., Valorani, M.
CSP-based chemical kinetics mechanisms simplification strategy for non-premixed combustion: An application to hybrid rocket propulsion (2017) Combustion and Flame, 186, pp. 83-93. DOI: [10.1016/j.combustflame.2017.07.035](https://doi.org/10.1016/j.combustflame.2017.07.035)
- [1] Creta, F., Lamioni, R., Lapenna, P.E., Troiani, G.
Interplay of Darrieus-Landau instability and weak turbulence in premixed flame propagation (2016) Physical Review E, 94 (5), art. no. 053102, . DOI: [10.1103/PhysRevE.94.053102](https://doi.org/10.1103/PhysRevE.94.053102)