

Allegato B

PASQUALE EDUARDO LAPENNA
Curriculum Vitae

Roma, 09/08/2024

Part I – General Information

Full Name	Pasquale Eduardo Lapenna
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Part II – Education

Type	Year	Institution	Degree and Notes
PhD	2017	Sapienza Univ. Roma	PhD Aeronautical and Space Technology / Dottorato di ricerca in Tecnologia Aeronautica e Spaziale Thesis title: <i>Mixing and non-premixed combustion at supercritical pressures</i> Advisor: Prof. Francesco Creta SSD: ING-IND/07 (ora IIND-01/G)
University graduation	2013	Sapienza Univ. Roma	MSc Space Engineering / Laurea Magistrale in Ingegneria Spaziale
University graduation	2011	Politecnico di Milano	BSc Aerospace Engineering / Laurea Triennale in Ingegneria Aerospaziale

Part III – Appointments

III.A – Academic Appointments

Start	End	Institution	Position and Notes
Apr. 2022	Present	Sapienza Univ. Roma	Ricercatore a tempo determinato di tipo A (RTD-A), Dipartimento di Ingegneria Meccanica e Aerospaziale; Title: <i>Simulazione numerica dei processi di combustione supercritica in camere di spinta di endoreattori a propellente liquido / Numerical simulation of supercritical combustion processes in thrust chambers of liquid rocket engines</i> SSD: IIND-01/G (ex ING-IND/07)
Mar. 2020	Feb. 2022	Sapienza Univ. Roma	Assegnista di Ricerca (post-Doc) Title: <i>Analisi numerica dello scambio termico sulle pareti di camere di spinta nella zona di iniezione dei propellenti in endoreattori ossigeno/metano / Numerical analysis of injector plate wall heat flux in oxygen/methane liquid rocket engine thrust chambers</i> SSD: IIND-01/G (ex ING-IND/07)

Jul. 2019	Feb. 2020	ENEA Research Center Casaccia	Ricercatore III livello (Researcher) Dipartimento di Efficienza Energetica, Laboratorio SPS-SEI - Soluzioni Energetiche Ingrate
Nov. 2017	Jul. 2019	Sapienza Univ. Roma	Assegnista di Ricerca (post-Doc) Title: Systematic strategies for the development of combustion models for LRE SSD: IIND-01/G (ex ING-IND/07)
Nov. 2016	Oct. 2017	Sapienza Univ. Roma	Assegnista di Ricerca Title: Numerical modeling and analysis of high- pressure reacting flows SSD: IIND-01/G (ex ING-IND/07)

III.B – Other Appointments

<i>Start</i>	<i>End</i>	<i>Institution</i>	<i>Position and Notes</i>
Jan. 2022	Feb. 2022	Barcelona Supercomputing Center (BSC); CASE Department	Visiting Researcher Host: D. Mira, Group leader of the Propulsion Technologies Group
May 2024	Present	Italian Section of the Combustion Institute	Responsible for the activities of the "Early Career Research groups"
Oct. 2023	Present	CYPHER Cost Action coor. by ULB Univ. Libre de Bruxelles	Database and benchmark Cases Co-Coordinator
Nov. 2019	Present	Sapienza Univ. Roma	Member of the Academic Council of Aerospace Engineering / Membro del Consiglio d'area didattica di Ingegneria Aerospaziale

Part IV – Teaching experience

<i>Year</i>	<i>Institution</i>	<i>Lecture/Course/Experience</i>
From 2019/2020 to Present 2023/2024	Sapienza Univ. Roma	"Propulsione Aerospaziale/Aerospace Propulsion" (3 CFU) Laurea Triennale in Ing. Aerospaziale / BSc Aerospace Eng. SSD: IIND-01/G (ex ING-IND/07)
From 2018/2019 to Present 2023/2024	Sapienza Univ. Roma	"Introduction to Turbulent Combustion Simulations" (1 CFU) MSc Aeronautical Eng. and MSc Space and Astronautical Eng. SSD: IIND-01/G (ex ING-IND/07)
From 2015/2016 to Present 2023/2024	Sapienza Univ. Roma	Tutor and assistant for the "Combustion" course; MSc Aeronautical Eng. and MSc Space and Astronautical Eng. SSD: IIND-01/G (ex ING-IND/07)
From 2019/2020 to Present 2023/2024	Sapienza Univ. Roma	Physics of injection and mixing, Second level Master in Space Transportation Systems (STS).
From 2015/2016 to Present 2023/2024	Sapienza Univ. Roma	Advanced Matlab ® Coursework Second level Master in Space Transportation Systems (STS)
2023/2024	Sapienza Univ. Roma	"Orientamento Next-Generation" Funded by PNRR /Next Generation EU
2018/2019 and 2020/2021	Sapienza Univ. Roma	Tutor for the "Spaceflight Mechanics" course; MSc Space and Astronautical Engineering SSD: IIND-01/C (ex ING-IND/03)
2019/2020	Sapienza Univ. Roma	"Theory and Modelling of high pressure flows in propulsion systems" (3CFU) PhD program in Aeronautical and Space Eng.
2019/2020	Sapienza Univ. Roma	Tutor for the "Advanced Spacecraft Dynamics" course; MSc Space and Astronautical Engineering SSD: IIND-01/C (ex ING-IND/03)

From 2016/2017 to 2018/2019	Sapienza Univ. Roma	Tutor and assistant for the “Solid Rocket Motors” course; MSc Space and Astronautical Engineering SSD: IIND-01/G (ex ING-IND/07)
From 2014/2015 to present	Sapienza Univ. Roma	Co-advisor of more than 100 thesis BSc and MSc and 8 PhD thesis (5 on-going): - R. Lamioni “Interplay of hydrodynamic instabilities and turbulence in premixed flames” XXXII ciclo (2016-2020); - G. Indelicato “Modelling of wall-bounded high pressure flows in Liquid Rocket Engines” XXXIV ciclo (2018-2022); - A. Remiddi “Multi-physics thermal characterization of rocket combustion chambers” XXXV ciclo (2019- 2023); - D. Cavalieri XXXVII ciclo (2021-2025); - F. D’Alessio XXVII ciclo (2021-2025); - H. Kavari XXXVII ciclo (2021-2025); - D. Schintu XXXIX ciclo (2023-2027); - C. Matteucci XXXIX ciclo (2023-2027);
From 2021/2022 to present	Sapienza Univ. Roma	Advisor for more than 10 thesis BSc and MSc in the context of Aerospace Propulsion

Part V - Society memberships, Awards, Habilitations and Invited Talks

V.A – Society Memberships

<i>Year</i>	<i>Title</i>
2018 to present	International Combustion Institute
2015 to present	Italian Section of the Combustion Institute

V.B – Awards

<i>Year</i>	<i>Title</i>
2021	Distinguished Paper in the Laminar Flames colloquium for the 38 th International Symposium on Combustion, title: “The effect of pressure on the hydrodynamic stability limits of premixed flames”

V.C – Habilitation

<i>Year</i>	<i>Title</i>
2020	National Scientific Habilitation for the Associate Professor position Abilitazione Scientifica Nazionale (ASN) SC 09/A1 Fascia II, SSD: IIND-01/G (ex ING-IND/07)

V.D – Invited Talks and seminars

<i>Year</i>	<i>Title</i>
2023	“Intrinsic Instabilities of premixed flames: from a fundamental topic to a modeling need for combustion LES of hydrogen-based and hydrogen-enriched fuels” TU Delft Aeroseminar series, invited by Prof. S. Hickel.
2023	“Intrinsically unstable hydrogen-air premixed flames: fundamental aspects and modelling strategies” 29 Settembre 2023, 40u40 E-lecture series on Combustion, invited by the Belgian Section of the Combustion Institute.

Part VI - Funding Information [grants and proposal as PI-principal investigator or I-investigator]

VI.A – Grants as PI

<i>Year</i>	<i>Title</i>	<i>Program</i>	<i>Grant value</i>
2022	HYDROGEN “The structure and dynamics of premixed hydrogen flames”	Iscra B grant CINECA	
2022	Combustion under extreme thermodynamic conditions for green propulsion and power	Sapienza Research Funds	
2021	A pragmatic support to the hydrogen economy: data-driven modeling of high pressure combustion for propulsion and power	Sapienza Research Funds	
2021	Enabling practical direct numerical simulations for propulsion and power	HPC-Europa 3, EU-funded	t
2019	LAB-TF “Direct Numerical Simulation of Transcritical mixing of laboratory scale jets”	Iscra B grant CINECA	
2018	DNS-LS “Direct Numerical Simulation of Large-Scale Turbulent Premixed Flames.”	Iscra B grant CINECA	
2017	TF-3D “Low-Mach number simulations of transcritical flows”	Iscra C grant CINECA	
2016	DL-3D “Numerical investigation of Darrieus-Landau instabilities on turbulent three-dimensional premixed flames”	Iscra C grant CINECA	

VI.B – Proposal as PI (grants not funded)

<i>Year</i>	<i>Title</i>	<i>Program</i>	<i>Grant value and notes</i>
2022	“Why HYdrogen-based fuels burn FASTER? (W-HY-FASTER)”	PRIN-PNRR 2022	
2020	Combustion under extreme thermodynamic conditions	BE-FOR-ERC SapiExcellence Sapienza	
2018	“FlameX Turbulent flames under extreme thermodynamic conditions”	MSCA-IF EU, ETH-Zurich	

VI.C – Grants as I

<i>Year</i>	<i>Title and role</i>	<i>Program/Committer</i>	<i>Grant value /notes</i>
2024	"Flame Improvement and Regulation for Enhanced Hydrogen Premixed Combustion FIREHPC" Role: WP manager, Group leader	Call:HORIZON-JTI-CLEANH2-2024 Horizon Europe e Clean Hydrogen Partnership	
2023-present	"Advancing the Combustion of Hydrogen-Ammonia blends for improved Emissions and stability Advancing the Combustion of Hydrogen-Ammonia blends for improved Emissions and stability ACHIEVE" P.I. Prof. F.Creta Role: Vice-PI, Task Manager and DMP responsible https://cordis.europa.eu/project/id/101137955	Call HORIZON-JTI-CLEANH2-2023 Horizon Europe e Clean Hydrogen Partnership	
2023-present	"Modelli Surrogati di bruciatori di interesse industriale alimentati da combustibili carbon-free" P.I. Prof. F. Creta Role: Investigator	Baker and Hughes (Nuovo Pignone Tecnologie)	
2023-present	"Green Energy" in the context of "SPOKE 6 - Multiscale modelling and Engineering Applications" del Centro Nazionale di Ricerca in HPC, Big Data e Quantum Computing, Role: Investigator	Piano Nazionale di Ripresa e Resilienza PNRR NextGeneration EU	
2022-present	"Supporto allo sviluppo di un motore ad alta spinta LOX-Metano" WP1-PI Prof. M. Valorani Role: Investigator in 5 WP	AVIO s.p.a..	
2020-2024	"Assistenza tecnica sulle tematiche dei lanciatori e della propulsione" P.I. Prof. F. Nasuti Role: Investigator for: WP3300 "Analisi numerica dello scambio termico sulle pareti di camere di spinta nella zona di iniezione dei propellenti" Role: Investigator	Italian Space Agency ASI	
2021-2023	"Idrogeno verde come combustibile: simulazione numerica a supporto dell'industria (GreenH2 CFD)" P.I. Prof. M. Bernardini Role: Investigator	Regione Lazio (Lazio Innova) POR FESR LAZIO 2014-2020	
2018-2021	"Sviluppo di modelli CFD di combustione su piattaforma OpenFOAM - Modellizzazione combustione supercritica e stima scambio termico su piastra di iniezione" Prof. M. Valorani Role: Investigator	AVIO s.p.a..	
2019-2021	"Diagnostica avanzata per analisi di simulazioni numeriche reagenti" PI Prof. M. Valorani Role: Investigator	KAUST Sub-award agreement OSR-2019-CARF-1975-35	

2018-2019	“Diagnostica avanzata per analisi di simulazioni numeriche reagenti” PI Prof. M. Valorani Role: Investigator	KAUST Sub-award agreement OSR-2018-CARF-1975-03	
2017-2018	”Technical Support Activities for VEGA- C, VEGA-E and P120-C-Work Order 1” Role: Investigator	European Space Agency program ”VEGA-E Upper Stage Engine Design Assessment”	
2014-2018	“Formulazione e sviluppo di tool diagnostici avanzati per analisi di simulazioni DNS reagenti ad alta fedeltà” PI Prof. M. Valorani Role: Investigator	KAUST Sub-award agreement OSR-2018-CARF-1975-03	
2014-2016	"Caratterizzazione dei fenomeni di combustione e scambio termico in camere di combustione per motori criogenici LOX/LCH4" Prof. M. Valorani Role: Investigator	AVIO s.p.a..	

Part VII – Research Activities, International collaborations and references

Keywords

Liquid Rocket Engine
Turbulent Combustion
Cryogenic Injection
Supercritical Pressure
Hydrogen
High Performance Computing

Brief Description

My research activities are mainly devoted to the modelling of reactive flows that are of interest for aerospace propulsion applications. Among others, I’m currently active in the following research topics, also in the context of international collaborations: - Turbulent combustion modelling and wall-heat transfer under high pressure and liquid rocket engine operating conditions - Physics and modelling aspects of cryogenic propellants injection at supercritical pressure - Data-driven modelling and experimental investigation of intrinsically unstable premixed flames and in particular hydrogen-based fuels - Combustion numerical simulations on High Performance Computing Infrastructures International collaborations: - Prof. A. Attili University of Edinburgh - Prof. M. Matalon University of Illinois at Urbana Champaign - Prof. G. Magnotti KAUST - Prof. H. Pitsch RWTH Aachen - Prof. C. Hasse TU Darmstadt - Dr. D. Mira Barcelona Super Computing Center References: - Prof. H. Pitsch, Director of ITV at RWTH Aachen, - Dr. D. Mira, Group Leader of Propulsion Technology at BSC
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Part VIII – Summary of Scientific Achievements

<i>Product type</i>	<i>Number</i>	<i>Data Base</i>	<i>Start</i>	<i>End</i>
Papers [Total]	46	Scopus	2016	Present 2024
Journal articles	31	Scopus	2016	Present 2024
Conference articles	14	Scopus	2016	Present 2024
Books chapters	1	Scopus	2016	Present 2024

Journal articles (not in Scopus at the present date)	3			
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Total Impact factor (ScimagoJR)	127,661
Average Impact factor (ScimagoJR and Scopus)	4,118
Total Citations	658
Average Citations per Product	14,3
Hirsch (H) index	15
Normalized H index*	2,14

*H index divided by the academic seniority (intended from the end of the PhD in 2017)

Part IX– Selected Publications

List of the 12 publications selected for the evaluation. For each publication report title, authors, reference data, citations and additional information

- [1] **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
Citations (Scopus): 68;
Altre informazioni: tra i 3 Representative Documents su SciVal Topics categoria - Supercritical Pressures; Rocket Engines; Combustion Chambers per il periodo 2016-2021
- [2] **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
Citations (Scopus): 27;
- [3] **Lapenna, P.E.** "*Characterization of pseudo-boiling in a transcritical nitrogen jet*" (2018) Physics of Fluids, 30 (7), 077106. DOI: 10.1063/1.5038674
Citations (Scopus): 44 ;
Altre informazioni: tra i 3 Representative Documents su SciVal Topics categoria - Supercritical Pressure; Rocket Engines; Spontaneous Combustion per il periodo 2018-2022
- [4] **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, Volume 158, pp. 460-469. DOI: 10.1016/j.actaastro.2018.07.025
Citations (Scopus): 32 ;
- [5] **Lapenna, P.E.** and 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
Citations (Scopus): 30 ;
- [6] 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
Citations (Scopus): 53 ;
- [7] 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
Citations (Scopus): 32 ;

- [8] **Lapenna, P.E.**, Lamioni, R., Creta, F. "*Subgrid modeling of intrinsic instabilities in premixed flame propagation*" (2021) Proceedings of the Combustion Institute, 2021, 38(2), pp. 2001–2011 DOI: 10.1016/j.proci.2020.06.192 Citations (Scopus):19 ;
- [9] 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 Citations (Scopus):18 ;
- [10] **Lapenna, P.E.** "*Thermodynamic small scales in transcritical turbulent jets*" (2021) AIAA Journal 59(6), pp. 1-5 DOI: 10.2514/1.J059664 Citations (Scopus):5 ;
- [11] Remiddi A., **Lapenna, P.E.** , Indelicato G., Valorani M., Pizzarelli M., Creta F. "*Heat Transfer in Rocket Combustion Chambers Firing Plates: Role of Injector Confinement*" (2023) Journal of Propulsion and Power, 39 (2), pp. 176 - 189, DOI: 10.2514/1.B38847 Citations (Scopus):1 ;
- [12] **Lapenna, P.E.**, Remiddi A., Molinaro D., Indelicato G., Creta F. "*A-posteriori analysis of a data-driven filtered wrinkled flamelet model for thermodynamically unstable premixed flames*" (2024) Combustion and Flame, 259, art. no. 113126, DOI: 10.1016/j.combustflame.2023.113126 Citations (Scopus):3 ;

Part X– Other Publications

X.A – Peer reviewed Journal Articles publications (indexed in Scopus)

- [13] 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.
- [14] 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.
- [15] 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.
- [16] 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
- [17] **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.
- [18] Ciottoli P.P., Lee B.J., **Lapenna, P.E.**, Malpica Galassi R., Hernandez-Perez F.E., Martelli E., Valorani M. and 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.
- [19] 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.
- [20] Lamioni, R., **Lapenna, P.E.**, Berger, L., Attili, A., Kleinheinz, K., Pitsch, H., Creta, F. "Pressure- induced Hydrodynamic Instability in Premixed Methane-Air Slot Flames" (2020) Combustion Science and Technology, 192 (11), pp. 1998-2009.
- [21] **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.
- [22] 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 (Switzerland), 13 (9), art. no. 5223.
- [23] **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.

- [24] Troiani G., **Lapenna, P.E.**, Lamioni R., Creta F. Self-wrinkling induced by Darrieus-Landau instability in turbulent premixed “Bunsen flames from low to moderately high Reynolds numbers” (2022) *Physical Review Fluids*, 7 (5), art. no. 053202
- [25] Remiddi A., Indelicato G., **Lapenna, P.E.**, Creta F. “Efficient time-resolved thermal characterization of single and multi-injector rocket combustion chambers” (2023) *Proceedings of the Combustion Institute*, 39 (4), pp. 5043 - 5052,
- [26] Zolla P.M., Fiore M., **Lapenna, P.E.**, Bianchi D., Nasuti F. “A design strategy for water-based noise suppression systems in liquid rocket engines firing tests” (2023) *CEAS Space Journal*, 15 (4), pp. 597 - 611,
- [27] Indelicato G., Remiddi A., **Lapenna, P.E.**, Creta F., Longmire N.P., Banuti D.T. “Dataset of Wall-Resolved Large-Eddy Simulations Turbulent Pseudoboiling in Cryogenic Hydrogen Pipe Flows” (2023) *Journal of Thermophysics and Heat Transfer*, 37 (1), pp. 133 - 146,
- [28] Berger L., Grinberg M., Jurgens B., **Lapenna, P.E.**, Creta F., Attili A., Pitsch H. “Flame fingers and interactions of hydrodynamic and thermodiffusive instabilities in laminar lean hydrogen flames” (2023) *Proceedings of the Combustion Institute*, 39 (2), pp. 1525 - 1534,
- [29] Lulic H., Breicher A., Scholtissek A., **Lapenna, P.E.**, Dreizler A., Creta F., Hasse C., Geyer D., Ferraro F. “On polyhedral structures of lean methane/hydrogen Bunsen flames: Combined experimental and numerical analysis” (2023) *Proceedings of the Combustion Institute*, 39 (2), pp. 1977 - 1986,
- [30] D’Alessio F., **Lapenna, P.E.**, Bottari S., Creta F. “*Intrinsically unstable hydrogen-enriched premixed ammonia flames: Analysis and modeling of NO formation*” (2024) *Proceedings of the Combustion Institute*, 40 (1-4), art. no. 105485,
- [31] **Lapenna, P.E.**, Troiani G., D’Alessio F., Creta F. “*Synergistic interplay of thermodiffusive instability and turbulence in premixed flames*” (2024) *Proceedings of the Combustion Institute*, 40 (1-4), art. no. 105499,

X.B – Conference publications (indexed in Scopus)

- [32] P. E. Lapenna, P. P. Ciottoli, and F. Creta, “The effect of fuel composition on the non-premixed flame structure of LNG/LOx mixtures at supercritical pressure”, (2016) 54th AIAA Aerospace Sciences Meeting. DOI: 10.2514/6.2016-0690
- [33] Ciottoli, P.P., Galassi, R.M., P. E. Lapenna, Leccese, G., Bianchi, D., Nasuti, F., Creta, F., Valorani, M. “Systematic strategies for thermochemical model reduction in rocket propulsion applications” (2018) 2018 Joint Propulsion Conference, art. no. AIAA 2018-4440, DOI: 10.2514/6.2018- 4440
- [34] P. E. Lapenna, R. Amaduzzi, D. Durigon, G. Indelicato, F. Nasuti and F. Creta “Simulation of a single-element GCH4/GOx rocket combustor using a non-adiabatic flamelet method”, (2018) 2018 Joint Propulsion Conference, art. no. AIAA 2018-4871, DOI: 10.2514/6.2018-4871
- [35] P. E. Lapenna, R. Lamioni, P. P. Ciottoli, and F. Creta, “Low-Mach number simulations of transcritical flows,” (2018) AIAA Aerospace Sciences Meeting, 2018, DOI: 10.2514/6.2018-0346
- [36] Indelicato, G., Vona, F., Remiddi, A., Lapenna, P.E., Creta, F. ”A flamelet-based numerical framework for the simulation of low-to-high mach number flows in LRE” (2020) AIAA Propulsion and Energy 2020 Forum, pp. 1 - 11, DOI: 10.2514/6.2020-3822
- [37] Remiddi A., Indelicato G., P. E. Lapenna, Creta F. Thermal characterization in LRE: a parametric analysis on injector arrangement (2021) AIAA Propulsion and Energy Forum, 2021, art. no. AIAA 2021-3567, DOI: 10.2514/6.2021-3567
- [38] Indelicato G., Remiddi A., P. E. Lapenna, Creta F. Application of wall functions approaches in the context of LRE combustion chambers simulations (2021) AIAA Scitech 2021 Forum, pp. 1 - 10.
- [39] Remiddi A., Indelicato G., P. E. Lapenna, Creta F. Effects of injector lateral confinement on lre wall heat flux characterization: Numerical investigation towards data-driven modeling (2021) AIAA Scitech 2021 Forum, pp. 1 - 15.
- [40] Indelicato G., Remiddi A., P. E. Lapenna, Creta F., Longmire N.P., Banuti D.T. Dataset of wall- resolved large eddy simulations for the investigation of turbulent pseudo-boiling and wall-functions in cryogenic hydrogen pipe flows (2022) AIAA Science and Technology Forum and Exposition, AIAA SciTech Forum 2022, art. no. AIAA 2022-0339. DOI: 10.2514/6.2022-0339
- [41] Remiddi A., Indelicato G., P. E. Lapenna, Creta F. Development and validation of an efficient numerical framework for Conjugate Heat Transfer in Liquid Rocket Engines (2022) AIAA Science and Technology Forum and Exposition, AIAA SciTech Forum 2022, art. no. AIAA 2022-2119, DOI: 10.2514/6.2022-2119
- [42] Cavalieri D., Liberatori J., P. E. Lapenna, Valorani M., Ciottoli P.P. Impact of non-ideal fluid modeling on droplet evaporation for aerospace applications (2023) *Proceedings of the International Symposium on Turbulence, Heat and Mass Transfer*
- [43] Cavalieri D., P. E. Lapenna Pressure effects on turbulent pseudo-boiling rate (2023) *Proceedings of the International Symposium on Turbulence, Heat and Mass Transfer*
- [44] Cavalieri D., Liberatori J., Galassi R.M., Lapenna P.E., Valorani M., Ciottoli P.P. "Unsteady RANS Simulations with Uncertainty Quantification of a Spray Combustor Under Liquid Rocket Engine Relevant Conditions" (2023) AIAA SciTech Forum and Exposition, 2023, DOI: 10.2514/6.2023-2148

- [45] Cavalieri D., Indelicato G., Remiddi A., Creta F., Ciottoli P.P., Lapenna P.E. A Pressure-Based Numerical Framework for Highly Stratified Transcritical Real-Fluids Simulations (2023) AIAA SciTech Forum and Exposition, 2023, DOI: 10.2514/6.2023-1666

X.C - Book Chapters (indexed in Scopus)

- [46] Lapenna, P.E., Berger L., Creta F., Pitsch H. "Hydrogen Laminar Flames" (2023) Green Energy and Technology, Part F1098, pp. 93 - 139. DOI: 10.1007/978-3-031-28412-0_3

X.D – Peer-reviewed Journal Articles publications (non-indexed in Scopus at the present date)

- [47] D'Alessio F., Matteucci C., Lapenna, P.E., Creta F. "Intrinsic instability of lean hydrogen/ammonia premixed flames: Influence of Soret effect and pressure" (2024) Fuel Communications, 19, art. no. 100110, DOI: 10.1016/j.fueco.2024.100110.
- [48] Remiddi A., Lapenna, P.E., Cavalieri D., Schintu D., Indelicato G., Attili A., Berger L., Pitsch H., Creta F. "Data-driven modeling of resolved and filtered thermo-diffusively unstable hydrogen-air flames" (2024) Proceedings of the Combustion Institute, (accepted, in press).
- [49] Al Kassar S., Berger L., Lapenna P. E., Creta F., Pitsch H., Attili A., "Efficient and accurate calculation of dispersion relations for intrinsically unstable premixed flames" (2024) Combustion and Flame (Accepted in press)

Part XI– Speaker at International and National Conferences

- Lapenna, P.E., P.P. Ciottoli, F. Creta and M. Valorani "Numerical investigation of unsteady laminar methane/LOx flamelet at supercritical pressures", 7th Europ. Combust. Meet., Budapest, Hungary (2015).
- Lapenna, P.E., P.P. Ciottoli, F. Creta and M. Valorani "Numerical investigation of ignition in laminar methane/LOx flamelet at supercritical pressures", 15th International Conference on Numerical Combustion, Avignon, France (2015).
- Lapenna, P.E. and F. Creta "Towards an Unsteady/Flamelet Progress Variable method for non-premixed turbulent combustion at supercritical pressures" 38th Meeting of Italian Sec. of Combust. Inst., Lecce (2015).
- Lapenna, P.E., P.P. Ciottoli and F. Creta "The effect of fuel composition on the non-premixed flame structure of LNG/LOx mixtures at supercritical pressure", 54th AIAA Aerospace Science Meeting (2016).
- Lapenna, P.E., R. Lamioni and F. Creta "LNG/LOX mixing and combustion under supercritical conditions", 5th Space Propulsion Conference (2016).
- Lapenna, P.E., R. Lamioni, G. Troiani and F. Creta "Darrieus-Landau induced regime of propagation of turbulent premixed flames in Bunsen configurations", 39th Meeting of the Italian Section of the Combustion Institute (2016).
- Lapenna, P.E., D. Cecere and F. Creta "Scalar mixing and transport modeling under transcritical conditions for turbulent combustion modeling", 8th Europ. Combust. Meet. (2017).
- Lapenna, P.E., R. Lamioni, G. Troiani and F. Creta "Numerical investigation of large scale effects on turbulent premixed flames", 40th Meeting of the Italian Section of the Combustion Institute (2017).
- Lapenna, P.E., R. Lamioni and F. Creta "Modeling scalar mixing and transport in LRE-like conditions", 7th European Conference for Aeronautics and Aerospace Sciences EUCASS (2017).
- R. Lamioni, Lapenna, P.E., G. Troiani and F. Creta "Effects of hydrodynamic instability on turbulent premixed morphology and propagation", 10th Medit. Combust. Symp. (2017).
- Lapenna, P.E., R. Lamioni, P. P. Ciottoli and F. Creta "Low-Mach number simulations of transcritical flows", 56th AIAA Aerospace Science Meeting (2018).
- Lapenna, P.E., G. Indelicato, R. Amaduzzi, D. Durigon, R. Lamioni and F. Creta "Consistent flamelet-based turbulent combustion modeling for liquid rocket engines", Joint Meeting of the German and Italian section of the Combustion Institute (2018).
- Lapenna, P.E., G. Indelicato and F. Creta "The effect of pressure on transcritical jets: a DNS study", 8th European Conference for Aeronautics and Aerospace Sciences EUCASS (2019).
- Lapenna, P.E., R. Lamioni and F. Creta "Subgrid modeling of intrinsic instabilities in premixed flame propagation", 38th International Symposium on Combustion in Adelaide, Australia 25 January - 29 January 2021.

- Lapenna, P.E., G. Troiani, R. Lamioni and F. Creta "Mitigation of Darrieus-Landau instability effects on turbulent premixed flames ", 38th International Symposium on Combustion in Adelaide, Australia 25 January - 29 January 2021.
- Lapenna, P.E., A. Remiddi, G. Indelicato, M. Valorani, M. Pizzarelli, F. Creta "Characterization of the injectors near-field region of LRE combustion chambers", 9th European Conference for Aeronautics and Aerospace Sciences EUCASS (2022), Lille, France.
- A. Remiddi, G. Indelicato, Lapenna, P.E., F. Creta "Multi-region thermal characterization in LRE combustion chambers", 9th European Conference for Aeronautics and Aerospace Sciences EUCASS (2022), Lille, France.
- Lapenna, P.E., A. Remiddi, G. Indelicato, F. Creta "A data-driven Filtered Wrinkled Flamelet model for premixed hydrogen-air flames ", 44th Meeting of the Italian Section of the Combustion Institute (2022).
- Lapenna, P.E., A. Remiddi, C. Matteucci, G. Indelicato, M. Valorani, R. Pellegrini, E. Cavallini, M. Pizzarelli, F. Creta "Large Eddy Simulations of injectors near-field and heat transfer in rocket combustion chambers", Aerospace Europe Conference 2023 - 10th EUCASS - 9th CEAS, Lausanne, Switzerland (2023)
- Lapenna, P.E., A. Remiddi, S. Bottari, M. Pizzarelli R. Pellegrini, E. Cavallini, M. Valorani, and F. Creta "Characterization of injectors near-field in LRE firing plates ", 19th International Conference on Numerical Combustion, Kyoto, Japan (2024).
- Lapenna, P.E., A. Remiddi, F. D'Alessio, G. Troiani and F. Creta "Data/DNS-driven modeling of thermo-diffusively unstable hydrogen-air flames", 19th International Conference on Numerical Combustion, Kyoto, Japan (2024).
- Lapenna, P.E., G. Troiani, F. D'Alessio and F. Creta "Synergistic interplay of thermodiffusive instability and turbulence in premixed flames", 40th International Symposium on Combustion, Milan, Italy (2024).
- Additionally, co-author of more 50 conference contributions from 2016 to the present date.

Part XII– Participation in organizing and scientific committee

XII.A – Conference organization

- Mini-Symposium organizer: "The Role of Intrinsic Instabilities in the Simulation of Premixed Combustion" 17th International Conference on Numerical Combustion 6-8 Maggio, 2019 Aachen, Germany.
- Member of the technical committee "Propulsion Physics" Aerospace Europe Conference 2023 Joint 10th EUCASS - 9th CEAS Conference
- Commission member "Best Student Paper Award" Aerospace Europe Conference 2023 Joint 10th EUCASS - 9th CEAS Conference
- Roundtable organizer "Database and benchmark cases in the CYPHER project" CYPHER COST Action First General Meeting 10-12 Apr. 2024.
- Member of the local organizing team della 20th International Conference on Numerical Combustion that will be held in Rome Oct. 2025.
- Member of the technical committee "Propulsion Physics" 11th EUCASS Conference that will be held in Rome Jun. 2025.

XII.B – Reviewer activity

- Peer-reviewed Journals: Combustion and Flame, Combustion Theory and Modelling, Combustion Science and Technology, Fuel, Energy, Proceedings of the Combustion Institute, Physical Review Fluids, Physics of Fluids, Engineering Applications of Computational Fluid Mechanics, Journal of Turbulence, Journal of Propulsion and Power, Acta Astronautica, International Journal of Heat and Mass Transfer, Applied Thermal Engineering, Atomization and Sprays
- Conferences: Meetings of the Italian Section of the Combustion Institute, AIAA Science and Technology Meeting, International Conference on Numerical Combustion, International Symposium on Combustion, Parallel CFD International Conference.

Le informazioni contenute nel presente curriculum vitae et studiorum sono rese sotto la personale responsabilità del sottoscritto ai sensi degli artt. 46 e 47 del D.P.R. 28 dicembre 2000 n. 445, per le ipotesi di falsità in atti e dichiarazioni mendaci. Autorizzo al trattamento dei dati personali ai sensi del D.Lgs 30 giugno 2003 n.196 e s.m.i.

Roma, 09/08/2024

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