



WORK EXPERIENCE

2019 – CURRENT – Rome, Italy

POSTDOCTORAL RESEARCHER – SAPIENZA UNIVERSITY OF ROME

Research activities: hybrid rocket engines, liquid rocket engines, hypersonics

Lecturer: "Chemical Equilibrium with Applications" module in the Master Course in Space Transportation Systems - 8 hours

Teaching assistant: "Rocket Propulsion" and "Space Propulsion Lab"

Rome, Italy

2015 – 2018 – West Lafayette, United States

RESEARCH ASSISTANT – PURDUE UNIVERSITY

Research activities: CFD simulations for fundamental research on thermoacoustics in supercritical fluids; Design of a transcritical thermoacoustic prototype in the thermal management team at the Rolls-Royce University Technology Center

West Lafayette, Indiana, United States

EDUCATION AND TRAINING

2015 – 2018 – West Lafayette, Indiana, United States

PH.D. IN MECHANICAL ENGINEERING – Purdue University

GPA: 4.0/4.0

Thesis: "Numerical and Theoretical Modeling of Thermoacoustic Instabilities in Transcritical Fluids"

2013 – 2015 – Rome, Italy

M.SC. IN SPACE ENGINEERING – Sapienza University of Rome

110/110 *cum laude*

Thesis: "Transient Response of Homogeneous Isotropic Turbulence to Heat Sources"

2010 – 2013 – Rome, Italy

B.SC. IN AEROSPACE ENGINEERING – Sapienza University of Rome

110/110 *cum laude*

Thesis: "Effect of Friction and Cooling on the Performance of Supersonic Nozzles"

● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● DIGITAL SKILLS

Tecplot 360 | Microsoft Office | Inkscape | Python | Fortran | Matlab | vim | LaTeX | bash
scripting | Git | C++ | CFD | RANS

● HONOURS AND AWARDS

Awards

2017 Rolls-Royce Doctoral Fellowship, Purdue University, IN, USA
2015 F. N. Andrews Fellowship, Purdue University, IN, USA
2015 Antonio Ventura Scholarship, Fondazione Roma Sapienza, Rome, Italy
2015 Excellence Path in Space Engineering, Sapienza University of Rome, Italy
2011–2013 Excellence Path in Aerospace Engineering, Sapienza University of Rome, Italy
2010–2013 Sapienza Deserving Student, Sapienza University of Rome, Italy
2010 Italian Ministry of Education Award for High School Excellence, Nomentano, Rome, Italy

● OTHER RELEVANT EXPERIENCE

Events organized

July 2019: Point of contact and organizer of Sapienza University of Rome for the 20th CVA Summer School held in Rome and Colleferro, Italy

University student teams

2021-present: Faculty Advisor of the Rocket Team of the Sapienza Aerospace Student Association (SASA)

July 2014: AIAA Cansat Competition, Sapienza Space Team (10 people): designed, built and launched an atmospheric probe model, Burkett, TX, USA

July 2013: CVA Summer School, Team leader of 11 people: designed a rocket model fired to 500m, Lampoldshausen, Germany

Thesis Co-Avisor

Co-advisor of more than 10 M.Sc. and B.Sc. theses with advisors Professors F. Nasuti, D. Bianchi, S. Heister

Contracts

SPIV (Sistema Propulsivo Ibrido VEGA, AVIO-ASI): 2020 - present

RIPAS (Rilancio dei Programmi di Accesso allo Spazio dalla Base di Malindi Luigi Broglio Space Centre (BSC) ASI): 2019 - 2020

RECOMMENDATIONS

Prof. Francesco Nasuti (PostDoc Mentor and B.Sc. Advisor, Sapienza University)

Prof. Daniele Bianchi (PostDoc Mentor, Sapienza University)

Prof. Carlo Scalo (Ph.D. Advisor and Mentor, Purdue University)

Prof. Stephen D. Heister (Ph.D. Mentor, Purdue University)

Prof. Bernardo Favini (M.Sc. Advisor, Sapienza University)

PUBLICATIONS

2021

[25] "Student firing tests and launches with commercial and self-made solid rocket motors", Migliorino, M.T., Aiello, M., Berti, M., Rotondi, M., D'Alessandro, S., Bianchi, D., Jahjah, M., Pizzarelli, M., *International Astronautical Congress*, 2021

[24] "Numerical Analysis and Wind Tunnel Validation of Low-Temperature Ablators undergoing Shape Change", Bianchi, D., Migliorino, M.T., Rotondi, M., Turchi, A., *International Journal of Heat and Mass Transfer*, 2021, 177, 121430

[23] "Experimental and numerical investigation of standing-wave thermoacoustic instability under transcritical temperature conditions", Martinez, A., Migliorino, M.T., Scalo, C., Heister, S.D., *Journal of the Acoustical Society of America*, 2021, 150(4), pp. 2900–2911

[22] "A Computational Tool for the Design of Hybrid Rockets", Zolla, P. M., Migliorino, M.T., Bianchi, D., Nasuti, F., Pellegrini, R. C., Cavallini, E., *Aerotecnica Missili & Spazio*, 2021, 100 (3), pp. 253-262

[21] "Numerical Approach for the Estimation of Throat Heat Flux in Liquid Rocket Engines", Concio, P., Migliorino, M. T., Nasuti, F., *Aerotecnica Missili & Spazio*, 2021, 100 (1), pp. 33-38

[20] "Gas-Phase Reaction Effects on Nozzle Erosion in Paraffin/Oxygen Hybrid Rockets", Migliorino, M.T., Bianchi, D., Nasuti, F., *AIAA Propulsion and Energy Forum*, 2021

[19] "Machine Learning Techniques for Flight Performance Prediction of Hybrid Rocket Engines", Zavoli, A., Zolla, P. M., Federici, L., Migliorino, M.T., Bianchi, D., *AIAA Propulsion and Energy Forum*, 2021

[18] "Numerical Analysis of Nozzle Transient Heating and Erosion in Hybrid Rockets burning HDPE", Rotondi, M., Migliorino, M.T., Bianchi, D., Kamps, L., Nagata, H., *AIAA Propulsion and Energy Forum*, 2021

[17] "Film cooling modeling in liquid rocket thrust chambers", Concio, P., D'Alessandro, S., Migliorino, M. T., Nasuti, F., *AIAA Propulsion and Energy Forum*, 2021

[16] "Numerical simulations of the internal ballistics of paraffin-oxygen hybrid rockets at different scales", Migliorino, M.T., Bianchi, D., Nasuti, F., *Aerospace*, 2021, 8(8), 213

[15] "Onset Criteria for Bulk-Mode Thermoacoustic Instabilities in Supercritical Hydrocarbon Fuels", Hunt, S.A., Migliorino, M.T., Scalo, C., Heister, S.D., *Journal of Fluids Engineering, Transactions of the ASME*, 2021, 143(4), 040901

[14] "System and Method for Stabilizing Transcritical Air-to-Fuel Heat Exchange", P. C. Sweeney, S. D. Heister, S. A. Hunt, C. Scalo, M. T. Migliorino, *US Patent* No. US 10,890,114 B2

[13] "Experimental demonstration of high-amplitude thermoacoustic instabilities under transcritical temperature conditions in a standing-wave device", Martinez, A., Kuras, B., Migliorino, M.T., Scalo, C., Heister, S.D., *AIAA Scitech Forum*, 2021

2020

- [12] "Numerical analysis of paraffin-wax/oxygen hybrid rocket engines", Migliorino, M.T., Bianchi, D., Nasuti, F., *Journal of Propulsion and Power*, 2020, 36(6), pp. 806–819
- [11] "Numerical and experimental analysis of capsules ablation and shape change including heating transient effects", Rotondi, M., Migliorino, M.T., Bianchi, D., Pagani, P., Turchi, A., *AIAA Propulsion and Energy Forum*, 2020
- [10] "A sensitivity study on a CFD model for paraffin-based hybrid rockets", Migliorino, M.T., Bianchi, D., Nasuti, F., *AIAA Propulsion and Energy Forum*, 2020
- [9] "Numerical analysis of nozzle heating and erosion in hybrid rockets and comparison with experiments", Bianchi, D., Migliorino, M.T., Rotondi, M., Kamps, L., Nagata, H., *AIAA Propulsion and Energy Forum*, 2020
- [8] "Real-fluid effects on standing-wave thermoacoustic instability", Migliorino, M.T., Scalo, C., *Journal of Fluid Mechanics*, 2020, 883, A23
- [7] "Heat-induced planar shock waves in supercritical fluids", Migliorino, M.T., Scalo, C., *Shock Waves*, 2020, 30(2), pp. 153–167

2019

- [6] "CFD analysis of paraffin-based hybrid rockets with coupled nozzle erosion characterization", Bianchi, D., Migliorino, M.T., Nasuti, F., Onofri, M., *AIAA Propulsion and Energy Forum*, 2019
- [5] "Predictive CFD model for internal ballistics of hybrid rocket engines using supercritical paraffin-wax and oxygen", Migliorino, M.T., Bianchi, D., Nasuti, F., *AIAA Propulsion and Energy Forum*, 2019

2018

- [4] "Assessment of spurious numerical oscillations in high-order spectral difference solvers for supercritical flows", Migliorino, M.T., Chapelier, J.-B., Scalo, C., Lodato, G., *AIAA Aviation Forum*, 2018
- [3] "Numerical and experimental analysis of a transcritical thermoacoustic prototype", Alexander, D., Migliorino, M.T., Heister, S., Scalo, C., *AIAA Aviation Forum*, 2018

2017

- [2] "Real fluid effects on thermoacoustic standing-wave resonance in supercritical CO₂", Migliorino, M.T., Gupta, P., Scalo, C., *AIAA Aviation Forum*, 2017
- [1] "Dimensionless scaling of heat-release-induced planar shock waves in near-critical CO₂", Migliorino, M.T., Scalo, C., *AIAA SciTech Forum*, 2017