

PERSONAL INFORMATION

Marco Rotondi

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Sex Male | Date of birth 20/07/1994 | Nationality Italian

WORK EXPERIENCES

2020 – Present

Research Fellow – Ph.D. Student (Space Propulsion)

University of Rome “La Sapienza”, Italy

Relevant activities:

- Conjugate CFD-material response simulations of ablation and shape change phenomena in HRE and SRM nozzles
- Research on the state-of-art of reduced models for ablation predictions in propulsive applications and subsequent model implementation and validation
- Implementation of reduced models for nozzle ablation in a propulsive system analysis tool (i.e., EcosimPRO-ESPSS)

2019 – 2020

Post-graduate Research Fellow (Space Propulsion)

University of Rome "La Sapienza", Italy

Post-graduate fellowship provided by CRAS (Centro Ricerca Aerospaziale Sapienza – Sapienza Aerospace Research Center)

Relevant activities:

- CFD simulations of ablation and shape change phenomena concerning HRE and SRM nozzles and re-entry vehicles.
- Research on the state-of-art of high temperature materials for propulsive applications (i.e., carbon-based ablatives and UHTCs)
- Research on the state of the art of launcher noise reduction using water injection during static firing tests. Collaboration to the development of a quasi-1D model for rocket noise predictions.
- Development of a quasi-1D code for the preliminary analysis and design of a supersonic scrubber for SRM particulate cleaning.
- Collaboration to the feasibility study in the context of the “Aeronautica Militare” project “Air-launcher”.

2013 – 2014

Swimming Instructor

Centro Federale Nuoto, Frosinone, Italy

2011 – 2013

Pool Lifeguard

Park Club Acquapark, Frosinone, Italy

EDUCATION AND TRAINING

2016 – 2019

Master of Science degree in Space and Astronautical Engineering (Launcher curriculum)

EQF level 7

University of Rome "La Sapienza", Rome, Italy
Thesis title: "Computational numerical analysis (CFD) of sublimation and shape change phenomena for atmospheric re-entry capsules"
Thesis advisor: Prof. Daniele Bianchi
Co-advisor: Dr. Mario Tindaro Migliorino
Grade: 108/110

2013 – 2016 **Bachelor degree in Aerospace Engineering** EQF level 6

University of Rome "La Sapienza", Rome, Italy
Thesis title: "Project and analysis of a hybrid rocket engine for an atmospheric sounding-rocket"
Thesis advisor: Prof. Daniele Bianchi
Grade: 105/110

2008 – 2013 **High school Diploma, Scientific high school**

Liceo Scientifico "G.Sulpicio", Veroli (FR), Italy
Grade: 100/100

2008 – 2010 **Music conservatory, Piano**

Conservatorio di musica "L.Refice", Frosinone, Italy
 Piano: I and II level courses

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
EF Standard English Test: C1 Advanced (www.efset.org/cert/BqW6qk)					
French	A2	A2	A2	A2	A2
Languages: French - Self-assessment grid					

Digital skills

	SELF-ASSESSMENT				
	Information processing	Communication	Content creation	Safety	Problem solving
	Proficient user	Proficient user	Independent user	Independent user	Proficient user

Digital competences - Self-assessment grid

Programming languages known: Fortran - Bash - MATLAB - EcosimPRO language - Latex

Software and programmes: MATLAB, Tecplot, CEA (Chemical Equilibrium with Applications), EcosimPRO ESPSS, CFD in-house codes, OpenFOAM, PATO, Paraview, Gnuplot, Latex, GitLab, Overleaf, Autodesk Fusion 360, Linux, Ubuntu, Open Rocket, Microsoft Excel, Microsoft Windows, Power Point, Audacity

Driving licence B

ADDITIONAL INFORMATION

Certifications

- **EF SET Standard English Test**
English level: **C1 Advanced**
Certificate: www.efset.org/cert/BqW6gK
Date: Aug 2019 – present
- **Certificate PEGASUS** (European Network of Excellence in Aerospace Engineering Education)
University of Rome “La Sapienza”
Date: Jul 2019 - present
- **Autodesk Fusion 360 OSNAP** certification
Certificate N° EM040709763594370588
Date: Nov 2018 – present

Activities and experiences

- **Physics private lessons** for university and high school students
Date: Jan 2020 – Jan 2021
- **NASA International Space Apps** challenge
Date: Apr 2016
- European **BEST** (Board of European Students of Technology) **Engineering competition**
Date: Dec 2015
- **Math private lessons** for university and high school students
Date: Sept 2014 – Jun 2015
Date: Sept 2019 – Nov 2020
Date: Jan 2020 – Jan 2021
- **Parish summer camp Organizer**
Date: Jul 2014 – Sept 2014

Courses

- **edX course – Hypersonics: from Shock Waves to Scramjets**
Provided by The University of Queensland, Australia
Date: Aug 2019 – Sept 2019
- **OSNAP course: Autodesk Fusion 360** Authorized Academic Partner
Certificate N° EM040709763594370588
Date: Nov 2018 - Dec 2018
- **Basic swimming instructor (FIN)**
Date: Jan 2013 - Mar 2013
- **MIP – Surf Lifeguard (FIN)**
Date: Jan 2011 - Mar 2011
- **P – International Pool Lifeguard (FIN)**
Date: Jan 2011 – Mar 2011

Publications

- M. Rotondi, M. T. Migliorino, D. Bianchi, P. Pagani, and A. Turchi, "Numerical and Experimental Analysis of Capsules Ablation and Shape Change including Heating Transient Effects", AIAA Propulsion & Energy 2020 Forum, Aug 2020
<https://arc.aiaa.org/doi/10.2514/6.2020-3969>
- D. Bianchi, M. T. Migliorino, M. Rotondi, L. T. Kamps, and H. Nagata, "Numerical Analysis of Nozzle Heating and Erosion in Hybrid Rockets and Comparison with Experiments", AIAA Propulsion & Energy 2020 Forum, Aug 2020
<https://arc.aiaa.org/doi/10.2514/6.2020-3767>
- D. Bianchi, M.T. Migliorino, M. Rotondi, and A. Turchi, "Numerical Analysis and Wind Tunnel Validation of Low-Temperature Ablators undergoing Shape Change", Elsevier, International Journal of Heat and Mass Transfer, vol. 177, n. 121430, Jun 2021
<https://www.sciencedirect.com/science/article/abs/pii/S0017931021005330>
- M. Rotondi, M.T. Migliorino, D. Bianchi, P. Pagani, and A. Turchi, "Numerical Analysis and Flight-Relevance Verification of Low-Temperature Ablators undergoing Shape Change", IPPW 2021, 18th International Planetary Probe Workshop, Jun 2021
<https://www.ippw2021.org/>
- M. Rotondi, M.T. Migliorino, D. Bianchi, L.T. Kamps, and H. Nagata, "Numerical Analysis of Nozzle Transient Heating and Erosion in Hybrid Rockets burning HDPE", AIAA Propulsion & Energy 2021 Forum, Aug 2021
<https://arc.aiaa.org/doi/abs/10.2514/6.2021-3496>
- M. T. Migliorino, M. Aiello, M. Berti, M. Rotondi, S. D'Alessandro, D. Bianchi, M. Jahjah, and M. Pizzarelli, "Student firing tests and launches with commercial and self-made solid rocket motors", 72nd International Astronautical Congress (IAC), Oct 2021
https://www.researchgate.net/publication/356557324_Student_firing_tests_and_launches_with_commercial_and_self-made_solid_rocket_motors
- D. Bianchi, M.T. Migliorino, M. Rotondi, L.T. Kamps and H. Nagata, "Numerical Analysis of Nozzle Erosion in Hybrid Rockets and Comparison with Experiments", AIAA, Journal of Propulsion and Power, Dec 2021
<https://arc.aiaa.org/doi/10.2514/1.B38547>
- M. T. Migliorino, M. Aiello, M. Berti, M. Rotondi, S. D'Alessandro, D. Bianchi, M. Jahjah, and M. Pizzarelli, "Student firing tests and launches with commercial and self-made solid rocket motors", Elsevier, Acta Astronautica (Journal), Apr 2022
<https://www.sciencedirect.com/science/article/abs/pii/S0094576522001837>
- M. Rotondi, P. Concio, S. D'Alessandro, F. R. Lucas, D. Bianchi, F. Nasuti, J. Steelant, "Development and Validation of Nozzle Erosion Models for Solid and Hybrid Rockets in the ESPSS Libraries", 8th Space Propulsion conference, May 2022
https://www.researchgate.net/publication/360588271_DEVELOPMENT_AND_VALIDATION_OF_NOZZLE_EROSION_MODELS_FOR_SOLID_AND_HYBRID_ROCKETS_IN_THE_ESPSS_LIBRARIES
- M. Rotondi, M. T. Migliorino, D. Bianchi, "Transient Material Response Analysis of Carbon-based Thermal Protection Systems for Rocket Nozzle Applications", 2nd International Conference on Flight Vehicles, Aerothermodynamics and Re-entry Missions Engineering (FAR), Jun 2022
<https://atpi.eventsair.com/far2022/>
- M. Rotondi, M. T. Migliorino, D. Bianchi, "Numerical Analysis of Carbon-based Nozzle Erosion including Transient Heating and Shape Change", AIAA Aviation Forum and Exposition, Jul 2022
<https://arc.aiaa.org/doi/abs/10.2514/6.2022-3949>
- M. Rotondi, M.T. Migliorino, D. Bianchi, P. Pagani, A. Turchi, "Numerical Assessment of Camphor Ablation Flight Relevance in Hypersonic Wind-Tunnel Testing", Journal of Spacecraft and Rockets, Jul 2022
<https://arc.aiaa.org/doi/10.2514/1.A35318>

Projects

- **Research Consultant – University of Rome “La Sapienza”:**
GSTP project - Mono and Bi-propellant Flow Characterization in Generic Propulsion System (EcosimPRO – ESPSS) - in collaboration with ESA, Etamax, EAI
Date: Apr 2020 – Apr 2021
- **Research Consultant – University of Rome “La Sapienza”:**
RIPAS project – Rilancio dei Programmi di Accesso allo Spazio dalla Base di Malindi “Luigi Broglio Space Centre (BSC)” - in collaboration with ASI (Italian Space Agency), KSA (Kenyan Space Agency)
Date: Sep 2020 – Jun 2021
- **Research Consultant – University of Rome “La Sapienza”:**
“Generazione E” project - Ricerca e sperimentazione di Materiali, sistemi Diagnostici e di Controllo ambientale per i veicoli di trasporto spaziale di generazione Evoluta - in collaboration with AVIO, CIRA, UniCA, IM, Sophia Tech
Date: Dec 2019 – Jul 2022

Thesis co-advisor

- **Bachelor degree** in Aerospace Engineering
A. Cingolani, “Nozzle throat erosion analysis in hybrid rocket motors”, Mar 2020
(Advisor: Prof. D. Bianchi; Co-Advisor: M. Rotondi)
- **Master degree** in Space and Astronautic Engineering
F. Ciotoli, “Flow Analysis and Design Optimization of a Solid Rocket Motor Ablative Nozzle”, Mar 2022
(Advisor: Prof. D. Bianchi; Co-Advisors: M. Fiore, M. Rotondi)