

Emanuele Martelli, Ph.D.

Position:

November 2017 - Present

Associate professor in aerospace propulsion, Università degli Studi della Campania "Luigi Vanvitelli", Aversa (CE), Italy.

Research Activities:

My main research activity regards the large eddy simulation of hydro-acoustic instability in over-expanded rocket nozzle flows, characterized by flow separation and shock wave/boundary layer interaction. Presently, the same kind of hydro-acoustic interaction is investigated in the internal flow-field of solid rocket motors, which suffer from pressure oscillations. A rich experience with intensive parallel simulations on high-performance-computing infrastructure has been gained during these years. In addition to these main theme, I acquired experience with the multi-physics phenomenon of gas-surface interaction in thermal protection structure both for re-entry problems and rocket nozzle thermal control. Finally, I dedicated myself to the analysis and simplification of complex chemical kinetic mechanisms and to the wavelet-based computational combustion.

Work experience:

September 2008 - October 2017

Assistant Professor in aerospace propulsion, Università degli Studi della Campania "Luigi Vanvitelli", Aversa (CE), Italy.

January 2008-August 2008,

Collaboration with the Department of Mechanics and Aeronautics, University of Rome "La Sapienza".

January 2006-December 2007

Post doc, Department of Mechanics and Aeronautics, University of Rome "La Sapienza".

Novembre 2002 – Novembre 2005

Ph.D student with fellowship in Theoretical and Applied Mechanics, Department of Mechanics and Aeronautics, University of Rome "La Sapienza".

May-July 2001

Stage post-lauream at ESTEC (European Space Agency, Noordwijk, The Netherlands).

Education

February 2006

Ph.D in Theoretical and Applied Mechanics, Department of Mechanics and Aeronautics, University of Rome "La Sapienza".

May 2001

Laurea in Ingegneria Aerospaziale (5 years course), score: 110 cum laude, University of Rome "La Sapienza".

Reviewer for the following journals:

Journal of Propulsion and Power (American Institute of Aeronautics and Astronautics).

Journal of Aerospace Engineering (SAGE).

Acta Astronautica (Elsevier).

Journal of Thermophysics and Heat Transfer (American Institute of Aeronautics and Astronautics).

Teaching activities

Course of Aerospace Propulsion, undergraduate level, from academic year: 2008/09.

Course of Aerospace Propulsion 2, graduate level. from academic year: 2015/16.

Course of Advanced Aerospace Propulsion, graduate level. from academic year: 2019/20.

Research Programs:

ESA contract: "Numerical Investigation of Dual Bell Nozzle Flow Separation Stability".

ESA contract: "Analysis of Vulcain 2 Engine Operational Anomalies".

ISP-1: Seventh Framework Program "In Space Propulsion".

CAST "Configurazioni Aerodinamiche Innovative per Sistemi di Trasporto Spaziale".

ESA-TRP "Multi physics Modelling of Near Surface Phenomena".

ESA-TRP "Study on the origin of Side Loads".

ESA-GSTP "Investigation on Self-adaptable Rocket Nozzles".

Grants at the Italian SuperComputing Resource Allocation (Iscra-B), CINECA, Italy.

2015, SW-DES-1-HP10BD97SG: numerical simulations of shock unsteadiness in a transonic nozzle.

2017: DLESRN17-HP10BF7UYS: numerical simulations of shock unsteadiness in an over-expanded planar nozzle.

2018: DDES-TIC-HP10BZR88R: numerical simulation of shock wave/boundary layer interactions in a rocket nozzle.

Metrics overview (Scopus):

40 documents;

470 citations;

H-index: 12.

Aversa, 22nd of February 2021

Prof. Emanuele Martelli.

