Fabio Argentesi

Date of birth: 24/12/1997 | **Place of birth:** Latina, Italy | **Nationality:** Italian | **Phone number:** (+39) 3279024122 (Mobile) | **Email address:** fabio.argentesi@uniroma1.it

WORK EXPERIENCE

SAPIENZA UNIVERSITÀ DI ROMA – ROMA, ITALY

UNIVERSITY RESEARCH ASSISTANT – 04/2025 – 09/2025

The continuation of my work within the DIMA–TAS-I collaboration started with my MSc thesis. My research focuses on the development of finite element solutions for Large Deployable Mesh Reflectors, specifically aimed at evaluating their unstressed configuration. This activity is carried out in close collaboration with other team members, involving thermal design, sensitivity analyses, and the use of force-density method-like techniques to model detailed structural elements of the reflector design.

EDUCATION AND TRAINING

2025 – CURRENT Rome, Italy

DOCTOR OF PHILOSOPHY - PHD, AERONAUTICAL AND SPACE ENGINEERING Sapienza Università di Roma

My PhD project aims to develop a framework that leverages Artificial Intelligence (AI), Computer Vision, and XR tools to advance Manufacturing, Assembly, Integration and Testing (MAIT) as well as On-Orbit Servicing activities, and to embed this framework within a Human–Robot (HR) collaborative environment.

Website https://www.uniroma1.it/it/pagina-strutturale/home

2022 – 2024 Rome, Italy

SPACE AND ASTRONAUTICAL ENGINEERING MASTER'S DEGREE Sapienza Università di Roma

Key courses: Space Constructions, Multibody Space Structures, Aerospace Materials and Technology, Spacecraft Design, Space Missions and Systems, Space Guidance and Navigation Systems.

During my master's studies, I gained expertise in key aerospace disciplines, including structural analysis, telecommunications and propulsion. My thesis focused on the design of Large Deployable Reflectors (LDR) as part of a collaboration between Sapienza DIMA and Thales Alenia Space Italia, where I contributed to the mesh implementation in the form-finding procedure and developed linear and nonlinear finite element methods to identify the reflector's unstressed configuration. This experience allowed me to deepen my knowledge of finite element methods for complex structures, as well as advanced programming through extensive use of MATLAB. Additionally, I enhanced my understanding of thermal and statistical analysis and developed essential professional skills, such as teamwork, autonomous work, meeting deadlines, report and paper writing, and structured team activities.

Website https://www.uniroma1.it/it/pagina-strutturale/home | **Field of study** Engineering, manufacturing and construction |

Final grade 104 | **Thesis** Finite Element-Based Form Finding of Large Deployable Mesh Reflectors

2017 – 2021 Rome, Italy

AEROSPACE ENGINEERING BACHELOR DEGREE Sapienza Università di Roma

Website https://www.uniroma1.it/it/pagina-strutturale/home

SKILLS

Matlab/Simulik | Video Conferencing (Zoom, Teams, Skype, Webex) - Advanced | Ability to work in a team and autonomously | Fusion-360 | Solid Edge | Basic knowledge of Orbitron | SAOImageDS9 (Basic) | Microsoft Office, LibreOffice, LaTeX

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	B2	B2	B2	B2	B2

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

PUBLICATIONS

2024

Optimizing The Design Of Large Deployable Mesh Reflectors In Presence Of Manufacturing Defects

Abstract:
Large Deployable Reflector (LDR) antennas and in particular mesh reflectors, have known an increasing demand for space applications in recent years. Once deployed, they exhibit considerable flexibility and are characterized by strong geometric nonlinearity featuring a large sensitivity to variations in cable lengths. Consequently, even minor manufacturing and assembly errors in cable lengths can lead to a degradation of the surface accuracy. This paper aims at developing a robust optimal design strategy for mesh reflectors, mitigating the negative effects on reflector surface precision caused by the unavoidable discrepancies in cable lengths during manufacturing. The proposed approach exploits the linearity of Force Density Method (FDM)-based equilibrium equations, deriving the static shape of the antenna after the introduction of design variations based on the Monte Carlo method. This approach allows to identify effective and stable optimal designs capable to grant the required performances in presence of manufacturing and assembly errors.
- Proceedings yet to be published-

G. Labella, E. Sicolo, F. Argentesi, S. Atek, M. Pasquali, P. Gaudenzi, Proceedings of ECSSMET 2024

2025

Geometrically Nonlinear Model of Cable Net and Mesh for the Manufacturing of Large Deployable Mesh Reflectors

Abstract:

Large Deployable Reflectors (LDR), particularly mesh reflectors, are a key technology to satisfy the increasing performance requirements of space telecommunications within limited mass and volume. LDRs are tensile structures whose shape can be determined after a process of form finding, after which a prestressed state is identified. For manufacturing purposes, the accurate definition of the unstrained state is critical. Due to LDRs' hyperstatic nature and geometric nonlinearity, traditional linear methods are inadequate. This work tackles this problem with a finite element approach based on the Newton-Raphson method to determine the unstrained configuration by simulating the tension release on the structure and progressively accounting for the unloading of its elements.

Authors: Fabio Argentesi, Giacomo Puletti, Sofiane Atek, Michele Pasquali, Antimo Colella, Luca Palomba, Davide Scarozza, Federico Adamo, Pasquale Martinelli, Marco Lapi, Mario Lanuti, Luigi Scialanga, Andrea Adriani | **Journal Name**: Proceedings of EUCASS 2025

2025

Enhanced Force Density Approach for the Thermo-Mechanical Design of Large Deployable Mesh Reflectors

Abstract:
This study explores the thermo-mechanical behavior of Large Deployable Mesh Reflectors (LDRs) used in space telecommunication, requiring high surface accuracy and compact stowage. The Force Density Method (FDM) is used to define the balanced in-orbit configuration and evaluates temperature-induced effects on the structure. Genetic algorithms (GAs) are implemented to optimize the on-ground configuration and to maximize the reflector performance under thermal variations. The approach integrates nonlinear equilibrium equations linking on ground and in orbit conditions, providing a valuable tool for LDR design mitigating thermal effects and ensuring proper LDR functionality during space operations.

Authors: Giacomo Puletti, Fabio Argentesi, Sofiane Atek, Michele Pasquali, Antimo Colella, Luca Palomba, Davide Scarozza, Federico Adamo, Giovanni Di Lella, Marco Lapi, Mario Lanuti, Luigi Scialanga, Andrea Adriani | **Journal Name**: Proceedings of EUCASS 2025