

Curriculum Vitae

DETAILS

Name Mattia Tornabene

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EDUCATION

Present **PhD in Mechanical, Manufacturing, Management and Aerospace Innovation XL Cycle. Expected rank: Top 1% student**
Expected 3 years University of Palermo (Italy)

Project title: Analisi Termografica nel dominio delle frequenze per la valutazione strutturale a fatica di materiali e componenti realizzati mediante processi tecnologici innovativi

Supervisor: Prof Giuseppe Pitarresi (Full professor at the University of Palermo, Italy)

Oct 2024 **Master in Aerospace Engineering, Expected rank: Top 5% student**
(2 years) University of Palermo (Italy)

Main Focus

- An annual project on the preliminary design of a firefighting drone
- Excellent knowledge about aerostructures
- Good knowledge about dynamics of flight, gasdynamics and propulsion
- Composite materials and manufacturing with focus on high-performance thermoplastics;
- Destructive and Non Destructive Tests (NDT) analysis for composite materials (Thermography, Digital Image Correlation, Vibro-Thermography, Mechanical testing)
- Finite Element Method (FEM)
- Advanced Statistical analysis (Design of experiments)

Supervisor: Prof Giuseppe Pitarresi (Full professor at the University of Palermo, Italy) and Ing. Massimiliano Russello (Aimen centro tecnologico)

Oct 2022 **Bachelor Degree in Aerospace Engineering**

(3 years) University of Enna (Italy), GPA: Top 10%

Main focus

- Theoretical and experimental analysis and characterization of materials with focus on polymers and composite materials
- Bases of Aerodynamics, flight mechanics and flight simulation
- Mechanical tests including tensile, shear, stiffness and fracture toughness characterization
- Finite Element Methods for aerostructures
- Manufacturing processes for composite materials and aerostructures

Thesis title: FEM analysis of a wing structure

Supervisor: Prof Andrea Alaimo (Full professor at the University of Enna, Italy)

EXPERIENCE

Present **Tutor in teaching support**

University of Palermo, Italy

Focus

This role consists in supporting the teaching activities at university following students in laboratory activities related to the experimental stress analysis (master's degree in mechanical engineering and aerospace) and in computational biomechanics of prostheses and orthoses (master's degree in biomedical engineering)

June 2024 **Visiting Researcher**

(6 months) AIMEN Technology Center (Advanced Composite Group)

Focus

My research project was focus on the investigation of innovative sequential welding technology where a large component is welded using aligned welding spots. The goal of this research line was to understand how thermography analysis can contribute for the detection of welding quality during manufacturing and use. I was focus on the understanding of the ultrasonic parameters that govern the technology, following, the study will focus on elaborating a strategy to detect welding quality. Different material systems, thickness or energy directors was evaluated and compared. An important part was focus on the study and application of Vibrothermography such as innovative ndt method for thermoplastic composites. Additionally offline inspection that include non destructive (TSA-DIC) and destructive testing will be performed.

Sept 2022 **Associated Researcher**

(6 months) University of Enna kore (Department of Aerospace Engineering)

Focus

- Development of FEM model for a wing structure using Patran-Nastran.

- Acquired knowledge in the evaluation of critical loads for wing structures
- Validation of results with current literature in the field

SUPERVISION EXPERIENCE

- March 2024** **Project assistance: Thermography analysis of Student Project**
AIMEN Technology Center (Spain)
Main activities: Supervision of MSc student to perform thermography analysis as a NDT test for composite components.

PAPERS

In preparation

- 2024** **M. Tornabene, M. Russello, G. Pitarresi, E. Rodriguez,** Online and Offline evaluation of Ultrasonically welded Thermoplastic Composite Materials using an innovative Vibrothermography method.
Expected Journal: Composite Structures

RESEARCH PROJECTS

- 2024** **R&D Project at AIMEN Techninology Center** Investigation of NDT methods for quantitative analysis of Ultrasonically Welded Thermoplastic Composites
- 2023** **R&D Project at University Of Palermo**

TRAINING AND TECHNICAL SKILLS

- 2024**
- **Composite manufacturing** for Thermoplastic and Thermosetting materials
 - Advanced Active and Passive **Thermography** (FLIR)
 - **Composite Welding Technologies** for Aeronautic Structures
 - **NDT analysis** of welded components
 - **Mechanical testing** for Advanced Materials
 - Fracture analysis and microscopy
- 2023**
- Digital image correlation – **DIC**
 - **Thermography**
 - **Statistica Analysis of Experiments**

- 2022**
- **FEM** modelling
 - **CAD** modelling
 - Classical Theory of Composite Materials
 - Aerostructure and Design

CERTIFICATES

- 2024** Associated Researcher Experience (AIMEN Technology Center)
- 2022** Licence for Aeronautic Maintenance (ENAC)
- 2019** European Computer Driving Licence (AICA)

LANGUAGES

- Italian** Native language
- English** Fluent
- Spanish** Basic

IT SKILLS

- Software**
- **CAD modelling:** Solid Edge, SolidWorks, AutoCad
 - **FEM:** Ansys, Abaqus, Patran-Nastran
 - **Image Analysis:** ImageJ
 - **Coding:** Matlab, Python
 - **Electronic Writers:** LateX