

# Emanuele D'Alessio

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Home: [REDACTED]

## WORK EXPERIENCE

**Università di Roma La Sapienza** – Roma, Italy

City: Roma | Country: Italy

### University teaching assistant

[ 01/02/2024 – Current ]

- Independent contract with the Department of Astronautical, Electrical and Energy Engineering at Sapienza University of Rome for tutoring in the course “Fluid Machinery in Energy Conversion Systems” (Master's Degree in Energy Engineering)  
- Tutoring in the course “Energy Systems” (Bachelor's Degree in Energy Engineering), Department of Astronautical, Electrical and Energy Engineering, Sapienza University of Rome

**University of Bayreuth** – Bayreuth, Germany

City: Bayreuth | Country: Germany

### Research Stay

[ 02/2024 – 02/2024 ]

Research stay at the University of Bayreuth to design and simulate, via DNS, a jet-impingement-based bipolar plate for HT-PEM fuel cells in collaboration with Prof. Sesterhenn.

**[REDACTED]** – Roma, Italy

City: Roma | Country: Italy

### Tutor

[ 09/2018 – 11/2023 ]

Private tutoring in mathematics (Calculus I & II, Linear Algebra, Euclidean Geometry, Arithmetic) and physics (Dynamics, Electromagnetism, Optics, Solid and Fluid Mechanics)

**Sapienza Flight Team - Università di Roma La Sapienza** – Roma, Italy

City: Roma | Country: Italy

### Team Leader

[ 07/2022 – 05/2023 ]

- Project management: Development of a fixed-wing autonomous drone for participation in the SUAS Competition (Student Unmanned Aerial Systems Competition)
- Management of departments: Software, Hardware, Computer Vision, Operations & Logistics, Design & Aerodynamics

**Sapienza Flight Team - Università di Roma La Sapienza** – Roma, Italy

City: Roma | Country: Italy

### Leader Software Subteam

[ 09/2021 – 07/2022 ]

- Development and validation of the autopilot for a fixed-wing drone using Matlab/Simulink
- Flight test management and telemetry data analysis
- Development and testing of sensor drivers

## EDUCATION AND TRAINING

### PhD in Energy and Environment

**Università La Sapienza** [ 11/2023 – Current ]

City: Roma | Country: Italy | Website: <https://www.uniroma1.it/it/pagina-strutturale/home> | Field(s) of study: Hydrogen Fuel Cell

Development of a comprehensive multiphysics model for the design and optimization of high-temperature PEM fuel cell stack geometry.

CFD, multiphysics modeling, and design and optimization of PEM fuel cells.

### **Bioenergy and New Biofuels for Sustainable Future – Advanced training school ENEA**

**ENEA, University of Pisa, and AIDIC** [ 27/10/2024 – 31/10/2024 ]

City: Research Centre ENEA Trisaia | Country: Italy | Website: <https://www.eventi.enea.it/tutti-gli-eventi-enea/eventi-enea/primopiano/save-the-date-1-bioenergy-school.html>

Advanced training school organized by ENEA, University of Pisa, and AIDIC on renewable fuel production technologies

### **MSc in Mechanical Engineering**

**Università La Sapienza** [ 02/2022 – 10/2023 ]

City: Roma | Country: Italy | Website: <https://www.uniroma1.it/it/pagina-strutturale/home> | Field(s) of study: Energy Systems | Final grade: 110L (average grade: 28.9) | Thesis: 3D Numerical Modeling of a PEM Fuel Cell: A Multiphysics Approach Using CFD

"Excellent Graduate" Award (Premio "Laureato Eccellente") | June 2025

Courses: Fluid Machinery, Advanced Energy Systems, Turbulence and Combustion, Turbomachinery, CFD, FEM Design

### **BSc in Mechanical Engineering**

**Università La Sapienza** [ 09/2018 – 12/2021 ]

City: Roma | Country: Italy | Website: <https://www.uniroma1.it/it/pagina-strutturale/home> | Final grade: 104 (average grade: 25.5) | Thesis: Finite Difference Method for Fluid Dynamics Problems

Courses: Fluid Dynamics, Solid Mechanics, Energy Systems, Metallurgy, Thermophysics, Industrial Plants, Mechanical Design

### **Classical High School Diploma**

**Liceo Classico Statale E. Q. Visconti** [ 09/2013 – 06/2018 ]

City: Roma | Country: Italy | Website: <https://www.liceoeqvisconti.it>

## **LANGUAGE SKILLS**

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**Mother tongue(s):** Italian

**Other language(s):**

**English**

**LISTENING C1 READING C1 WRITING C1**

**SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2**

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

## **SKILLS**

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Fluent - Ansys / Python - livello ottimo / Matlab/Matlab Simulink / Padronanza del Pacchetto Office (Word Excel PowerPoint ecc) / Programmazione in ambiente Julia / Uso software CAD (autodesk Inventor, Solidworks, Solidedge)

## **PUBLICATIONS**

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[2024]

### **Accuracy estimation of a CFD multiphysics approach to study a mixed parallel and serpentine flow channels PEM fuel cell**

Multiphysics CFD numerical study of a PEM fuel cell (50 cm<sup>2</sup>), experimentally validated: optimization of electrochemical parameters and analysis of thermo-fluid dynamic interactions.

Emanuele D'Alessio et al 2024 J. Phys.: Conf. Ser. 2893 012076

Links: <https://iopscience.iop.org/article/10.1088/1742-6596/2893/1/012076> | [DOI 10.1088/1742-6596/2893/1/012076](https://doi.org/10.1088/1742-6596/2893/1/012076)

## HONOURS AND AWARDS

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[ 06/06/2025 ] La Sapienza, Università di Roma

### "Excellent Graduate" Award (Premio "Laureato Eccellente") | June 2025

Official recognition awarded to a select group of top-performing graduates for outstanding academic achievement in the 2022-2023 academic year. The formal ceremony was held in the presence of the University Rector and high-level institutional representatives.

## CONFERENCES AND SEMINARS

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[ 04/09/2024 – 06/09/2024 ] University of Genova, Italy

### Powering the future Innovation and sustainable development for industry, communities, and sports

79th Annual Congress of the Italian Thermotechnical Association (ATI)

[ 16/07/2024 – 17/07/2024 ] Rome, Italy

### POR H2 – National Hydrogen Research Event

National conference organized by ENEA, RSE, and CNR on the Italian Hydrogen Research Plan, focusing on hydrogen technologies, infrastructure, and collaboration among research institutions and universities.

[ 06/03/2024 – 08/03/2024 ] Sorbonne Université - Faculté des Sciences et Ingénierie Campus Pierre et Marie Curie, Paris France

### Machine Learning for Fluid Dynamics

## PROJECTS

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[ 09/2022 – 01/2023 ]

### Computational fluid mechanics analysis of a wind turbine blade

Group project for the course "Computational Thermo-Fluid Analysis in Fluid Machinery". The project involved the analysis of the aerodynamic performance of an eroded wind turbine blade profile and comparison with the performance of the nominal (non-eroded) profile.

[ 09/2022 – 01/2023 ]

### Preliminary design of a sCO<sub>2</sub> axial turbine

Group project for the "Fluid Machinery" course. We designed an axial turbine operating with supercritical CO<sub>2</sub> for a Brayton cycle. The design process involved the careful selection of the most suitable machine for the given inlet conditions and concluded with the creation of the turbine's CAD model. The final outcome was a three-stage machine, whose design process was carried out using Python.

[ 02/2022 – 06/2022 ]

### Modelling and simulation of turbulent processes

Group project for the laboratory on turbulent processes. We used Julia software to analyze a 3D turbulent flow through the study of the invariants of the Reynolds stress tensor and the Q-criterion. The project was supervised by Prof. Joern Sesterhenn from the University of Bayreuth.

[ 02/2021 – 06/2021 ]

### Design of the production cycle for the components of a rigid coupling

Group project for the course "Manufacturing Technology and Engineering".

Design of the production cycle for the components of a rigid coupling, involving foundry processes, machine tools, and plastic deformation.