

Julia Favaro

M.Sc. Physics student

I am pursuing a Master's Degree with a focus on data analysis and experimental astrophysics at the University of Pisa. My main research interests are the interfaces between Particle Physics and Astrophysics. My passion lies in bridging rigorous research with effective science communication, ensuring that discoveries in high-energy astrophysics inspire both the scientific community and the public.

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in julia-favaro-00

🔗 Julia-Favaro

EDUCATION

M.Sc. Experimental Astroparticle Physics

🏛️ University of Pisa 📅 Present 📍 Pisa, Italy

- Focus on high-energy physics and multi-messenger astrophysics
- Current average grade: 29.9/30

B.Sc. Physics

🏛️ University of Pisa 📅 December, 2023 📍 Pisa, Italy

- Final grade: 110/110
- Average grade: 28.1/30
- Thesis: *Observation of quantum conductance in nanocontacts in an electromagnetic relay at room temperature.*
- Supervisor: Prof. Stefano Roddaro

COURSEWORK

Particle physics classes:

- *Standard Model of Particle Physics*: Experimental and theoretical foundations, relativistic kinematics, scattering and decay processes, symmetries, QED, strong, weak interactions and Higgs mechanism .
- *Introduction to neutrino physics*: phenomenology of neutrino interactions, oscillations and mass measurements, with application in accelerator, solar, and atmospheric physics, astrophysics and cosmology.
- *Laboratory*: detection and measurements of cosmic muons related observable quantities and cosmic showers. Measurement were performed by use of plastic scintillators and photomultiplier tubes.

Astrophysics classes:

- *Multimessenger physics*: introduction to electromagnetic multiwavelength and gravitational wave data analysis techniques. Different astrophysical sources like FRBs, AGNs and CBCs.
- *Astroparticle physics*: cosmological parameters, astronomical neutrinos, cosmic ray and acceleration theory, GWs theory and detection fundamentals.
- *Extragalactic astrophysics and cosmology*: high-redshift universe, stellar population in galaxies, galaxy dynamics, and chemical evolution.

AWARDS

Scholarship

🏛️ INFN 📅 April 2024

Awarded by INFN (Italian Nuclear Physics Center) as part of the "More Women in Physics" Project. National competition for the awarding of n. 25 scholarships for female students enrolled in the master's degree course in Experimental and Theoretical Physics, Fundamental Interactions and in Applied Physics

EXPERIENCE

Tutor and teaching assistant, Astrophysics and MultiMessenger Laboratory

🏛️ University of Pisa 📅 Mar – Jun 2026 (3 months) 📍 Pisa, Italy

- The *Astrophysics and MultiMessenger Laboratory* is targeted at Master students in Physics, interested in observational astronomy. The coding and laboratory classes cover different techniques and data acquisition methods currently used in multimessenger physics .
- Role: supporting these students in the data analysis experience with O3 gravitational-wave data and GRBs data from FERMI-BGO. Lecturers: Prof. A. Ricciardo and Prof. M. Razzano.

Tutor and teaching assistant, Foundation Science Course

🏛️ University of Pisa 📅 Sep – Nov 2025 (3 months) 📍 Pisa, Italy

- The *Foundation Science Course* is targeted at international students who do not hold a secondary school diploma equivalent to the Italian one and therefore require this additional preparatory year to qualify for university studies in Italy.
- Role: supporting these international students in acquiring the fundamental mathematical skills needed for their future scientific studies. All lessons were taught in English, both online and in person. Supervisor: Dr. Massimo Caboara.

CERN Summer Student Program 2025

🏢 CERN 📅 Jul – Aug 2025 (9 weeks) 📍 Meyrin (Geneva), Switzerland

- Internship with a 3% acceptance rate.
- Research Project: *Trigger primitive (TP) simulation-data comparisons and cosmic data selection in ProtoDUNE Horizontal Drift detector*. Offline trigger study at Far detector, in a single detector (PDHD) with different Argon Time Projection Chambers (LARTPCs). My contribution centered on characterizing TP properties dependence on track angles across various configurations and noise conditions. This analysis addressed the feasibility of rapidly identifying cosmic muons in LARTPC by their track angle and clustering challenges in high-multiplicity noisy data. Supervisors: Dr. Klaudia Wawroska and Dr. Alessandro Thea.

Outreach at Advanced VIRGO site

🏢 EGO 📅 Sep 2024 – current 📍 Cascina (Pisa), Italy

- Role: Lead and support guided tours at the Advanced VIRGO site, explaining complex scientific concepts related to gravitational waves in an accessible manner to audiences and contributing to the educational mission of the outreach VIRGO collaboration group.
- Skills: Enhanced public speaking and communication skills, particularly in technical information. Worked with large groups: both with the general public and school groups; both in Italian and English. Referees: Elisa Velcani and Vincenzo Napolano.

DESY Summer Student Program 2024

🏢 DESY 📅 Jul – Sep (8 weeks) 📍 Zeuthen (Berlin), Germany

- Internship with a 6.5% acceptance rate, Internship
- Research Project: *Investigating the atmospheric aerosol's influence on the Crab measurements using HESS and VERITAS telescopes*. Aerosol Optical Depth (AOD) data was provided by the Copernicus Programme. My contribution focused on characterizing the correlation between VERITAS datasets and AOD values across different quality cuts, seasonal atmospheric models, and zenith angles. Supervisors: Dr. Sylvia Jiechen Zhu, Dr. Tobias Kai Kleiner and Dr. Tim Lukas Holch.

VOLUNTEERING

Lights of Tuscany 2025 (LoT25)

🏢 AISF 📅 Oct 2024 – May 2025 📍 Pisa and Florence, Italy

<http://ai-sf.it/lot/>

- Lights of Tuscany is an international event organized by the Italian Association of Physics Students (AISF) to coincide with the International Day of Light. Set in Pisa and Florence, it brings together students, researchers, and professionals from all over Europe to discuss optical and matter physics topics, showcasing research from local research centers of excellence.
- Role: Secretary and media outreach manager. Helping coordinate the Organizing Committee, fundraising and securing sponsors and grants, securing press coverage of the event. Currently part of the new Organizing Committee for the next edition of 2026.

DIGITAL SKILLS

Latex

Advanced

Git

Intermediate

Matlab

Beginner

Python / Jupyter Notebooks

Advanced

C / C++

Intermediate

ROOT

Beginner

In particular, on Python:

- Worked with CSV and FITS files.
- Basic data reduction, OOP and basic ML technique.
- Packages: Photutils, GammaPy, AstroPy, Pandas.

SOFT SKILLS

Adaptability

multidisciplinary setting and proven hardworking student

Teamwork & collaboration

worked in international teams and fostered cooperation

Communication & outreach

experience as VIRGO guide

Planning & Organization

coordinated logistics and event management for AISF initiatives

LANGUAGES

Italian

Mother tongue

English

Mother tongue

French

A2-B1 level

OUTSIDE INTERESTS

Theatre

actively participate in local theatre productions, both on stage and behind the scenes. Regularly attend theatre workshops.

Visual arts

frequently going to modern art exhibitions. I also have an interest in appealing visual presentations.

Writing

currently learning techniques useful for writing scientific communication articles for a broad audience.