

# ANNA PRETO

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Languages: French-English-Spanish-Portuguese

Updated: October 2025

## EXPERIENCE

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- 2025 (Oct - Present) - **PhD Student in Cosmology and Machine Learning** *Researching gravitational shear analysis using Bayesian neural networks to study dark energy with the Vera Rubin Observatory (LSST).*  
CIFRE PhD: Mews Labs (Cachan, France), Astroparticles and Cosmology Laboratory (APC) (Paris, France)  
Supervisors: Dr. Eric Aubourg, Dr. Cécile Roucelle  
Company mentor: Dr. Vincent Laurent
- 2024 (Sept - Present) - **Machine Learning Engineer** *Designing and developing machine learning solutions for diverse business use cases, including CNN and ViT models for image analysis, temporal predictive models, fine-tuning and adaptation of LLMs (transformers, autoencoders, Mixture of Experts), statistical NLP (TF-IDF, Bayesian inference, embeddings, RAG), and application development and deployment with CI/CD pipelines.*  
Mews Labs (Cachan, France)
- 2024 (Mar - Jul) - **Research Project on Self-Interacting Dark Matter (SIDM)** *Studying the dependence of dark matter content within galaxies on galactic properties and constraining the cross-section of self-interacting dark matter models.*  
Cosmology and Galaxy Evolution Laboratory  
Supervisor: Dr. Camila Correa  
CEA, DFR/IRFU/DAP/LCEG (Saclay, France)
- 2023 (May - Jul) - **Master I Thesis** *Modeling the propagation of manuscripts and the emergence of distinct manuscript traditions in history using stochastic models.*  
Supervisors: Dr. Jean-Baptiste Camps and Julien Randon-Fuerling  
École des Chartes (Paris, France) and ENS (Saclay, France)
- 2022 (May - Jul) - **Bachelor Thesis** *Star formation and protoplanetary disks with RAMSES.*  
Supervisor: Dr. Mathias González  
CEA, DFR/IRFU/DAP/LMPA (Saclay, France)
- 2021-2022 - **Head of Design Department** in a student association  
Association Physis7 (Paris, France)

## RESEARCH INTERESTS

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Galaxy formation and evolution  
Cosmology and cosmological simulations  
Machine learning for cosmological applications  
Deep learning research  
Large Language Models and Natural Language Processing  
Dark matter, dark energy, and MOND theories

## TEACHING & SUPERVISION

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*2025 (Feb-Jul)*

**Technical co-supervision of Master's Internship**

Co-mentoring Valentina Meija Gallon (ENSAM) on the development of agentic LLMs for the analysis of CSRD/RSE reports.

*2023 - 2024*

**Mathematics Teacher**

8h/week, *Collège Thomas Mann (Paris, France)*

*2020 - 2023*

**Mathematics Teacher**

8h/week, *Collège Octave Gréard (Paris, France)*

## EDUCATION

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*2023 - 2024*

**Master II Astronomy, Astrophysics and Space Engineering**

Graduated with Honors

*Université Paris Cité - École Normale Supérieure - Observatoire de Paris/Meudon (Paris/Meudon, France)*

*2022-2023*

**Master I Fundamental Physics**

Graduated with Honors

*Université Paris Cité (Paris, France)*

*2019-2022*

**Bachelor in Fundamental Physics**

Graduated with Merit

*Université Paris Cité (Paris, France)*

*2018-2019*

**Scientific Baccalaureate**

Graduated with High Honors

*Lycée Julie Victoire Daubié (Argenteuil, France)*

## SCHOLARSHIPS, GRANTS AND AWARDS

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*2019-2021*

**Maison des Jeunes Talents Program**

Program for promising students: offered two years of free housing in Paris and customized academic courses to foster excellence.

*Apr 2018*

**Highly selective internship for high school students**

Selected among 300 applicants for 15 available spots

*Institut d'Astrophysique de Paris (IAP, Paris, France)*

## PROJECTS AND COLLABORATIONS

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<i>Oct. 2025</i>	<b>ArcanAI [GitHub]</b> ArcanAI is a small Streamlit app combining tarot readings with interpretation by a LLM.
<i>Since Sept. 2025</i>	<b>Phosphate Price Prediction</b> Predicting phosphate market fluctuations using statistical and machine learning models.
<i>Since Jul. 2025</i>	<b>Patent Search and Analysis</b> Developed a tool to search molecules in patents and analyze their legal and scientific scope using LLMs and CNN/ViT models.
<i>Since May 2025</i>	<b>Papyrus [GitHub]</b> Open-source modular package for text and OCR extraction, designed to combine multiple extractors and centralize results.
<i>Mar. 2025</i>	<b>Text2Table</b> Tool using a LLM to automatically extract tabular information from textual documents.
<i>Jan. 2025</i>	<b>DRAGON Collaboration</b> Internal Mews Labs R&D project on LLMs, resulting in a publication on Retrieval-Augmented Generation (RAG) with Dr. Marion Schaeffer - INSA, Rouen
<i>2023</i>	<b>Galaxy Collision Simulations</b> Fortran simulation of galaxy collisions using Cloud-in-Cell method and Jacobi solver.
<i>2023</i>	<b>Mobile App Development</b> Dart mobile app displaying friends' upcoming birthdays and enabling search by first name.
<i>2023</i>	<b>Music Style Prediction Algorithm</b> Project predicting music styles using various machine learning algorithms and neural networks.
<i>2022</i>	<b>Kirkwood Gaps Simulation</b> Python-based simulation of Kirkwood Gaps using Leapfrog integration to model and analyze orbital anomalies.

## ARTISTIC ACTIVITIES AND SCIENTIFIC EXPRESSION

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I have a strong interest in areas beyond science, notably in the arts. I have cultivated these passions alongside my academic career, enriching my scientific projects with an artistic perspective. This approach has proven highly effective in scientific communication and knowledge dissemination, for instance through posters and comics.

*2016 - Present*

Photographer

- Photographer for 'Les Bateaux Parisiens' with Photo Filmage Paris
- Freelance photographer
- Exhibiting photographer at Bois-Colombes Art Salon, 2021 and 2022 editions

*2014 - Present*

Graphic Designer and Portrait Artist

- Freelance graphic designer (visual identity and logo creation for companies such as B'art Metallerie or Le Ranch de Saint-Prix)
- Voluntary poster design for theater groups
- Exhibiting portrait artist at Bois-Colombes Art Salon, 2021 and 2022 editions

*2014 - Present*

Actress

- Extra in the film *Faking a Living* by Joël Chalude
- Role of Alonso in *The Tempest* (W. Shakespeare), directed by Patrick Séguillon
- Role of Helena in *A Midsummer Night's Dream* (W. Shakespeare), directed by Michele Brulé
- Participation in *Les gens bien*, directed by Alexandre Lenis
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