

Delphine Doutsas

PhD Student at Mines Paris - PSL University

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I am currently a third-year PhD student at STIM, Mines Paris - PSL and LSP, École Normale Supérieure - PSL, under the supervision of Bruno Figliuzzi and Peter Neri. My research interests gravitate around inverse problems and generative modeling. I initially worked on hyperspectral unmixing before exploring Dirichlet β -VAEs where I identified a β -threshold for the collapse phenomenon in those models. My interests have now broadened toward recent advances in generative modelling, including for discrete data. Looking ahead, I am particularly interested in their potential for solving challenging inverse problems in scientific applications, especially in biology and robotics.

Education

Mines Paris, Ecole Normale Supérieure - PSL University <i>PhD in Applied Mathematics</i> Applied mathematics to address the problem of blind hyperspectral unmixing in challenging scenarios.	Paris, France 2023–Currently
Sorbonne University - Paris 6 <i>MSc in Engineering of Robotics and Automatic Systems</i> High honors with ranking 5/51 (1st semester), 4/53 (2nd semester) and 6/67 (3rd semester). Master thesis graded 17/20.	Paris, France 2020–2022
Sorbonne University - Paris 6 <i>BSc in Mathematics (Gap year in 2017).</i>	Paris, France 2016–2020
Sorbonne University - Paris 6 <i>Additional courses in Physics</i> Courses taken in parallel with the degrees' courses (BSc level): Mechanics, Special Relativity, Introduction to Thermodynamics.	Paris, France

Experience

Thales Land And Air Systems <i>Apprenticeship during MsC 2nd year</i> Parallelization and optimization of radar signal processing filters for GPU. Unfortunately, confidential content.	Limours, France 2022
Sorbonne University - Paris 6 <i>Research Project: Introduction to Research</i> Recognition and reproduction of body poses by the PEPPER robot with programming on the meta-operating system ROS.	Paris, France 2022
Institut du Cerveau et de la Moelle Epiniere (ICM) <i>Summer Research Internship</i> Deep Learning for melanoma characterization on histopathological images.	Paris, France 2021

Publications and pre-publications

- D. Doutsas, B. Figliuzzi, A Critical β -Scale for Posterior Collapse in Dirichlet β -VAEs, NeurIPS, 2026
- D. Doutsas, B. Figliuzzi, Effective-dimension control of β in Dirichlet β -VAE for Blind Hyperspectral Unmixing, CVPR, MORSE workshop, 2026
- D. Doutsas, B. Figliuzzi, Optimal Transport Based Hyperspectral Unmixing for Highly Mixed Observations, IEEE WHISPERS conference, 2024

Conferences and Presentations

- Dec 2026:** Poster. NeurIPS 2026, Paris (France)
- Jun 2026:** Poster. CVPR 2026 MORSE workshop, Denver (United States of America)
- Jun 2025:** Poster. The Beg Rohu Summer School of Physics, Saint-Pierre Quiberon (France)
- Apr 2025:** Presentation. French-German Workshop on Mathematical Image Processing, Fraunhofer ITWM, Kaiserslautern (Germany)
- Dec 2024:** Presentation. IEEE WHISPERS conference, Helsinki (Finland)

Event Participation

Sep 2026: DeepInverse Hackathon. Participated to development of DeepInv library.

Mar 2026: IDRIS Open Hackathon. Participated in a GPU HPC & AI hackathon focused on accelerating and optimizing scientific and AI codes on modern GPU architectures. GitHub repository.

Teaching

Mines Paris - PSL University

2025 - now: IASD M.Sc - Deep Learning for Image Analysis

2024 - now: 1st year Engineering Program - Signal Processing and Functional Analysis.

2023 - 2024: Bioluminescence Imaging (BIM) M.Sc, Machine Learning

Sorbonne University

2021 - 2022: Tutoring for B.Sc students.

Supervision

Co-Advisor: Haidar Ali Youssef - Engineering student from Mines Paris on a 3-month research project, advised with B. Figliuzzi.

Awards and Distinctions

- Co-recipient of the *Best paper award* at CVPR 2026 MORSE workshop.
- Co-recipient of the *Bioucas-Dias outstanding paper award* at WHISPERS 2024 conference.

Skills

Languages: French (native), English (fluent), Spanish (basic skills)

Programming: Python (NumPy, Keras, Pytorch, Tensorflow), LaTeX, Git, CUDA language.