

# Emile Pierret

Born on January 21, 1997.

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🌐 <https://pierret.perso.math.cnrs.fr>

## Education

- 2025 – Present    📌 **Post-doc.** *Université Paris Cité, ENS, France*  
Advisor: Julie Delon.
- 2022 – 2025    📌 **Ph.D. in Mathematics.** *University of Orléans, France*  
Thesis topic: *Stochastic Super-resolution and Inverse Problems: From Gaussian Conditional Sampling to Diffusion Models.*  
Ph.D. advisor: Bruno Galerne.
- 2021 – 2022    📌 **Master's Degree (M2) in Mathematics, Vision, Learning (MVA).** *ENS Paris-Saclay, Gif-sur-Yvette, France*  
Research-oriented Master's program.
- 2020 – 2021    📌 **French National Agrégation in Mathematics (external track).** *ENS Paris-Saclay, Gif-sur-Yvette, France*  
Option B.
- 2019 – 2020    📌 **Master's Degree (M1) – Jacques Hadamard Program.** *ENS Paris-Saclay, Cachan, France*  
Research internship: *Uncertainty quantification in COVID-19 spread: lockdown effects.*  
Supervisor: Ana Carpio, *Universidad Complutense de Madrid.*
- 2018 – 2019    📌 **Double Bachelor's Degree in Mathematics and Computer Science.** *ENS Paris-Saclay, Cachan, France*
- 2018    📌 **Admitted as a normalien at ENS Paris-Saclay (4-year program)**  
Admission via the Computer Science competitive entrance exam.
- 2015 – 2018    📌 **Preparatory Classes for the French Grandes Écoles.** *Lycée Descartes, Tours, France*  
MPSI (Mathematics, Physics, Engineering Science), followed by MP\* (Advanced Mathematics and Physics).

## Publications

### Preprint

- 1    É. Pierret and B. Galerne, *Exact evaluation of the accuracy of diffusion models for inverse problems with gaussian data distributions*, 2025.

### Journal papers

- 1    É. Pierret and B. Galerne, "Stochastic super-resolution for gaussian microtextures," *SIAM Journal on Imaging Sciences*, vol. 18, no. 2, pp. 1176–1207, 2025. 📄 DOI: 10.1137/24M1657407.
- 2    A. Carpio and E. Pierret, "Uncertainty quantification in covid-19 spread: Lockdown effects," *Results in Physics*, vol. 35, p. 105 375, 2022, ISSN: 2211-3797. 📄 DOI: <https://doi.org/10.1016/j.rinp.2022.105375>.


### Conference papers

- 1    E. Pierret and B. Galerne, "Diffusion models for gaussian distributions: Exact solutions and wasserstein errors," in *Forty-second International Conference on Machine Learning*, 2025. 📄 URL: <https://openreview.net/forum?id=bxYbxzCI2R>.

## Talks


### Invited Talks

- June 2025




**A Precise Examination of Diffusion Models via Their Application to Gaussian Distributions.**

*Images, Optimization and Probability Seminar, University of Bordeaux.*
- June 2025




**On the accuracy of diffusion models in Bayesian image inverse problems: A Gaussian case study.**

*SMAI 2025, Carcans Maubuisson.*
- May 2025




**On the accuracy of diffusion models in Bayesian image inverse problems: A Gaussian case study.**

*ANR MISTIC days, Lyon.*
- February 2025




**Diffusion models for Gaussian distributions: Exact solutions and Wasserstein errors.**

*Mathematical Imaging and Surface Processing Workshop, MFO Oberwolfach, Germany.*
- January 2025




**Diffusion models for Gaussian distributions: Exact solutions and Wasserstein errors.**

*Imaging in Paris Seminar, Paris.*
- November 2024




**Diffusion models for Gaussian distributions: Exact solutions and Wasserstein errors.**

*Workshop on Stochastic Geometry and Mathematics for Imaging, Nice.*
- October 2024




**Stochastic super-resolution for Gaussian microtextures.**

*ANR MISTIC days, Vannes.*
- June 2024



**Stochastic super-resolution for Gaussian microtextures.**

*LAREMA PhD Seminar, Angers.*
- May 2024




**Introduction to diffusion models and their restriction to the Gaussian case.**

*CANUM 2024, Île de Ré.*


### Posters

- July 2025



**Diffusion models for Gaussian distributions: Exact solutions and Wasserstein errors.**

Poster presentation, *ICML 2025*, Vancouver.
- January 2025



**Diffusion models for Gaussian distributions: Exact solutions and Wasserstein errors.**





Poster presentation, *Mathematics and Image Analysis (MIA'25)*, Paris.

## Talks (continued)

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- June 2023     **Stochastic super-resolution for Gaussian textures.**  
Poster presentation, *ICASSP 2023*, Rhodes, Greece.

## Outreach Talks and Working Group Presentations

- June 2024     **Tutorial: *Introduction to Neural Networks*.**  
*IDP PhD Week*, Courcimont Farm.
- June 2023     **Introduction to diffusion models and practical session.**  
*IDP Deep Learning Working Group*, Orléans.
- June 2023     **Presentation of the “RePaint” method.**  
*Diffusion Models Working Group*, MAP5, Paris.
- June 2023     **Stochastic super-resolution for Gaussian textures.**  
*IDP PhD Week*, Courcimont Farm.



## Teaching Experience

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- 2022 – 2025     **Lectures and practicals – Image Learning (15h).** *University of Orléans*  
Master’s level (M1) in Applied Mathematics.  
Introductory course on neural networks for image classification.
- 2023 – 2025     **Tutorials – Algebra 3 (49h).** *University of Orléans*  
Second-year undergraduate level (L2) in Mathematics.  
Tutorials in linear algebra.
- 2022 – 2023     **Tutorials – Calculus (49h).** *University of Orléans*  
First-year undergraduate level (L1), first semester.  
Tutorials introducing fundamental tools in analysis and algebra.

## Service and Responsibilities



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- 2024     **Elected alternate member of the Research Committee**, University of Orléans
- 2022–2025     **Organizer of the PhD seminar**, Institut Denis Poisson (Orléans–Tours)



## Skills

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### Languages

- English     **C1 level** (IELTS 7/9, 2020)
- Spanish     **C1 level**

### Programming

- Advanced proficiency     Python, PyTorch, MATLAB,  $\text{\LaTeX}$ , Caml
- Basic knowledge     C, C++, Assembly language, R