# Louis Thiry

12 rue Ordener, 75018 Paris, France ⊠ louis.thiry@outlook.fr "
↑ https://www.di.ens.fr/louis.thiry

## Personal Information

Date of Birth May 6, 1993 Nationality French

#### Education

- 2018–2021 **PhD in Applied Mathematics**, *ENS Paris*, Paris. Supervised by Stéphane Mallat. Modeling deep neural networks for image recognition. Development of energy regression methods for atomic systems in physics. Development of interactive systems between artists and AI.
  - 2017 Master's Degree in Mathematics, Vision, and Learning, ENS Paris-Saclay, Cachan.
- 2012–2016 Engineering Degree, École Polytechnique, Palaiseau.
  - 2011 Preparatory Class MP\*, Lycée Saint Louis, Paris.

## Research Experience

- 2024–2025 Core Team Researcher, *H-Company*, Paris. Research on autonomous agents based on large language models (LLMs) and vision-language models (VLMs). Use of reinforcement learning techniques to optimize models for web navigation scenarios.
   2024 Postdoctoral Researcher, *INRIA Paris*, Paris.
  - Study of numerical dissipation for advection schemes in oceanic equation solvers. Development of differentiable numerical models for data assimilation and hybrid physical/machinelearning modeling.
- 2021–2023 **Postdoctoral Researcher**, *INRIA Bretagne-Atlantique*, Rennes. Study of transport scheme impact on quasi-geostrophic equation solutions for Gulf Stream modeling. Work on the link between quasi-geostrophic and Saint-Venant equations using projection. Development of local bases (wavelets) for stochastic parametrization via Location-Uncertainty for QG and Saint-Venant equations.
  - 2017 **Research Intern**, *Google DeepMind*, London. Learning a Kohn-Sham-type density functional for computing quantum properties of molecules.

## **Teaching Activities**

- 2021–2023 **Course Lecturer**, *Intro to Statistics and Probability (L3)*, ENS Rennes, Rennes. Created a new undergraduate course covering: Law of Large Numbers, Central Limit Theorem and applications (confidence intervals, hypothesis testing), and introduction to machine learning.
  - 2022 External Instructor, Intro to Deep Learning, CEA, Grenoble.
     Led a 3-day professional training course with ENSAE at CEA for R&D engineers.
     Covered deep learning fundamentals and image processing with convolutional neural networks.
- 2018–2021 **PhD Teaching Assistant**, *Data Science Course*, Collège de France, Paris. Organized course assessments in the form of data challenges in collaboration with industry partners. Managed oral exams and logistics.



2022 Supervisor, Undergraduate Research Internship (L3), Rennes.
 Supervised Gauvain Thomas, computer science undergraduate at ENS Rennes, on a 2-month research internship.
 Study and PyTorch implementation of a Poisson equation solver using geometric multigrid methods, applied to quasi-geostrophic equations.

[GitHub link]

### Peer Reviewing

- 2024 **Reviewer**, *ICML*. Reviewed 6 papers on machine learning for science and physics-informed ML.
- 2024 **Reviewer**, *Geoscientific Model Development*. Reviewed a paper on ML-based parameterization for coastal ocean modeling.
- 2024 **Reviewer**, *ICLR 2024*. Reviewed 5 papers on ML for science and physics-informed ML.
- 2023 **Reviewer**, *NeurIPS 2023*. Reviewed 4 papers on ML for science and physics-informed ML.

#### Outreach

2022 **Guest Speaker on AI and Art**, *P versus NP Event*, Futurium Museum, Berlin. Live demo of AI-generated portraits drawn by a robotic arm. [YouTube link]

## Other Professional Activities

- 2023 **ML Consultant for Weather Forecasting**, *atmo.ai*, San Francisco (remote). Optimization of transformer-based networks for local weather modeling.
- 2020 **Computer Vision Consultant**, *NJF Vision*, Paris. Worked on automatic fraud detection in ID documents from video streams.

## Journal Publications

- 2024 A Unified Formulation of Quasi-Geostrophic and Shallow Water Equations via Projection, *Thiry et al.*, Journal of Advances in Modeling Earth Systems.
- 2023 MQGeometry-1.0, Thiry et al., Geoscientific Model Development.
- 2021 Solving the Fractional Electron Problem, Kirkpatrick et al., incl. Thiry, Science.
- 2020 **ML Surrogate Models for Vibrational Entropy**, *Lapointe et al., incl. Thiry*, Physical Review Materials.
- 2019 Kymatio: Scattering Transforms in Python, Andreux et al., incl. Thiry, JMLR Software.
- 2019 **Collision Model for Cosserat Rods**, *Tschisgale et al., incl. Thiry*, Archive of Applied Mechanics.
- 2018 Wavelet Scattering for Molecular Properties, *Eickenberg et al., incl. Thiry*, Journal of Chemical Physics.

### International Conference Papers

- 2021 Effectiveness of Patches in Conv Kernels, Thiry et al., ICLR 2021.
- 2020 Scattering and Homotopy Learning, Zarka et al., incl. Thiry, ICLR 2020.
- 2020 Interactive Neural Style Transfer, Kerdreux, Thiry et al., ICCC 2020.

Conferences and Workshops

- 2025 When GFD Meets Discrete Differential Geometry, *Roullet and Thiry*, International Conf. on GAFD, IUEM, Plouzané.
- 2024 Wavelet Transport Noise for Ocean Models, *Tucciarone et al., incl. Thiry*, STUOD Workshop, Ifremer, France.
- 2022 **Modified Hyper-viscosity in Ocean Models**, *Thiry et al.*, STUOD Workshop, Imperial College London.
- 2020 **Diptychs of Human and Machine Perception**, *Cabannes, Kerdreux, Thiry*, NeurIPS 2020 Creativity Workshop.
- 2019 **Dialog on a Canvas with a Machine**, *Cabannes, Campana, Ferrandes, Kerdreux, Thiry*, NeurIPS 2019 Creativity Workshop.

#### Preprints

2024 Classification-Denoising Networks, Thiry and Guth, submitted to ICLR.

#### Software Development

Kymatio: Python implementation of the wavelet scattering transform (link).
Challenge Data ENS: Supervised learning competition platform (link).
MQGeometry: Multi-layer QG equations on non-rectangular domains in PyTorch (link).
QGSW: QG and Saint-Venant equations via projection method in PyTorch (link).

#### Languages

French Native. English Fluent.

German Fluent.