Matthieu Blanke

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RESEARCH POSITIONS

Courant Institute of Mathematical Sciences — **New York, USA**
Postdoctoral Associate — 2025
Deep learning for climate models, advised by Sara Shamekh and Pierre Gentine.

EDUCATION

Inria Paris and DI ENS — **Paris, France**
PhD — 2021-2024
Deep learning for physical systems, advised by Marc Lelarge.

École Normal Supérieure Paris-Saclay — **Paris, France**
Master of Science *Mathématiques, Vision, Apprentissage (MVA)* — 2020-2021
Machine learning, optimization and statistics. Also passed exams of statistical physics courses at ENS Paris.

École polytechnique — **Paris, France**
Engineer's degree *Cycle ingénieur polytechnicien* — 2017 - 2021
Applied mathematics, computer science, theoretical physics

WORK EXPERIENCE

Inria Paris — **Paris, France**
Research internship — April - September 2021
Deep implicit layers with applications to physical systems. Advised by Marc Lelarge.

Econophysix — **Paris, France**
Research internship — June - September 2020
Particle-based stochastic modeling of the latent order book. Advised by Michael Benzaquen and Jean-Philippe Bouchaud.

Saildrone — **Alameda, CA, USA**
Platform team intern — June - August 2019
Processing of oceanographic data collected by drones, fault detection.

PUBLICATIONS

An updated list is available on my Google Scholar page.

• Matthieu Blanke, Ronan Fablet, Marc Lelarge. Neural Incremental Data Assimilation. Accepted at the AI for Science workshop, at ICML 2024.

• Matthieu Blanke, Marc Lelarge. Interpretable Meta-Learning of Physical Systems. The Twelfth International Conference on Learning Representations, 2024 (ICLR 2024).
Also presented at the Synergy of Scientific and Machine Learning Modeling workshop, at ICML 2023 (SynS & ML 2023).

• Matthieu Blanke, Marc Lelarge. FLEX: an Adaptive Exploration Algorithm for Nonlinear Systems. The Fortieth International Conference on Machine Learning, 2023 (ICML 2023).
Also presented at the Machine Learning and the Physical Sciences workshop, at NeurIPS 2022.

• Matthieu Blanke, Marc Lelarge. Online greedy identification of linear dynamical systems. 61st Conference on Decision and Control, 2022 (CDC 2022).

Also presented at the Adaptive Experimental Design and Active Learning in the Real World workshop, at ICML 2022.

• Matthieu Blanke, Jose Moran, Pierre-Philippe Crépin, Jean-Philippe Bouchaud, Michael Benzaquen. Market impact in a multiple metaorder landscape. Under submission.

PROJECTS AND SOFTWARE

The projects are available on my GitHub page.

Neural Incremental Data Assimilation 2024
Deep learning model for the data assimilation inverse problem, built with JAX.

CAMEL 2023
Interpretable meta-learning of physical systems

FLEX 2022
Adaptive exploration of physical systems.

Deep Latent Variable Models 2021
Maximum likelihood sampling and missing data imputation based on deep learning. Supervised by S. Allassonnière.

Market impact simulator 2020
Python module for noisy market impact experiments.

Image segmentation: Random Walker and SegNet 2019
Theoretical study and Python implementation of the Random Walker algorithm. Performance benchmark versus the deep learning architecture SegNet. Supervised by S. Allassonnière.

Automatic sport scene modeling 2020
A C++ library that automatically detects the players' positions on a sport video.

Machine learning for power consumption forecast 2019
Clustering, pattern detection and statistics on weather data from Météo France to predict energy consumption. Implemented the algorithms from scratch in C++.

IP-over-Discord 2018
A C program and a Node.JS Discord Bot for IP-over-Discord network tunneling.

Physics exercise book Ongoing
Open source exercise book for undergraduate students preparing for the competitive exams for the top French engineering schools.

TALKS

09/2024 **Huawei Lavender Summit 2024, invited talk** Bordeaux
Interpretable Meta-Learning of Physical Systems.

03/2024 **Mines Paris Geosciences Department, invited talk** Paris
Interpretable Meta-Learning of Physical Systems.

07/2023 **MLIA seminar, invited talk** Paris
Interpretable Meta-Learning of Physical Systems.

12/2023 **ICML in Paris, contributed talk** Paris
FLEX: an Adaptive Exploration Algorithm for Nonlinear Systems.

04/2023 **Oral presentation for Safran Research** Paris
Exploration of physical systems.

12/2022 **ML4Physical Sciences workshop, poster presentation** Paris
Online exploration of nonlinear physical systems.

10/2022 **Inria PhD Seminar, oral presentation** Paris
Exploration of physical systems.

06/2022 **GdR IASIS, poster presentation** Paris
Online greedy identification of physical systems. "Apprentissage et modélisation physique" workshop.

09/2021 **CIRM Workshop, poster presentation** Marseille
Deep learning isochronism. “On Future Synergies for Stochastic and Learning Algorithms" workshop.

TEACHING

Mines PSL **Paris, France**
Teaching assistant Fall 2023
Probability theory. Differential equations.

Université Paris Cité **Paris, France**
Teaching assistant Spring 2023
Numerical physics.

Université Paris 1 Panthéon-Sorbonne **Paris, France**
Teaching assistant Fall 2022
Statistics.

Université Paris Cité **Paris, France**
Teaching assistant Spring 2022
Numerical physics.

Université Paris 1 Panthéon-Sorbonne **Paris, France**
Teaching assistant Fall 2021
Statistics.

École polytechnique, X-Talents **Paris, France**
Oral Examiner 2018
Weekly mathematics and physics oral tests preparing undergraduate students for the competitive entrance examinations of French top engineering schools.

SERVICE

Organizer of Inria Argo team’s seminar 2022-2024

Reviewing ICLR, ICML Workshop Synergy of Scientific and Machine Learning Modeling, NeurIPS workshop on Machine Learning and the Physical Sciences, IEEE Control Systems Letters, IEEE CDC

SKILLS

Computer languages Python, Julia, C, C++, Node.js, LaTeX

Python frameworks PyTorch, JAX

LANGUAGES

Frenc Native
Italian Native
English Fluent
German Advanced
Spanish Conversational