PIERRE FERNANDEZ

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EDUCATION

Meta AI & Inria, *PhD in Mathematics and Computer Science*   **2022 – present**
Advisors: Teddy Furon (Inria) & Hervé Jégou (prev. Meta AI), Matthijs Douze (Meta AI)   *Rennes & Paris, France*

Paris-Saclay University, *MSc in Mathematics, Vision and Learning ("MVA")*   **2020 – 2021**
World's best university in Mathematics in Shangai's ranking 2021 - with Highest Honors, GPA: 4.0/4.0   *Paris, France*
Relevant coursework:
- Convex optimization, Kernel methods, RL, Sequential learning, Graphs in ML, Computational statistics
- 3D Computer vision, Object recognition, Point clouds, Deep learning in practice, Digital humanities meet AI

École des Ponts ParisTech, *Double Degree: Masters in Mathematical Engineering*   **2020 – 2021**
Relevant coursework: Law, Accounting, Project with Renault: OCR integration in cars navigation system   *Remote, France*

École polytechnique, *BSc & MScT in Artificial Intelligence and Visual Computing*   **2017 – 2021**
France's best engineering school - with Highest Honors, GPA:3.95/4.0   *Palaiseau, France*
Awards:
- Outstanding Investment & Outstanding Leadership for involvement in school community life
- Research Internship Award in Computer Science for my first internship at Dassault Systemes (top 5%)
- Ranked 4th at the entrance exams

Relevant coursework:
- Machine & Deep Learning, Statistics, Markov Chains, Random Processes, Fundamentals of Probabilities
- Computer vision, Shape analysis, Computer graphics, Data visualization, Topological data analysis
- Molecular biology and genetic information, Pathologies and therapeutic strategies, Neuroscience

Stanislas, *Physics and Chemistry*   **2015 – 2017**
Two-year intensive program for the entrance exams to top French Engineering schools   *Paris, France*

WORK EXPERIENCE

Meta AI, *CIFRE PhD student*   **2022 – present**
Meta AI Paris team & Linkmedia team at Inria   *Rennes & Paris, France*
Research on content protection and AI safety (watermarking, indexing, generative models, etc.)

Meta AI, *AI Research Intern*   **May 2021 – Sep. 2021**
Meta AI Paris team, advised by Hervé Jégou, Matthijs Douze and Alexandre Sablayrolles   *Remote, France*
- Image watermarking with self-supervised latent spaces
- Topics: watermarking, steganography, self-supervised learning, computer vision

Dassault Systemes, *Research Intern*   **Apr. 2020 – Aug. 2020 & Sep. 2021 – Dec. 2021**
World leader company in 3D design & engineering software   *3DS Campus - Vélizy, France*
- Research on differentiable physics for robotics and structural optimization (using Jax and Taichi)
- Topics: automatic differentiation, physics simulation, topology optimization, genetic algorithms (NEAT, CMA-ES)

Incepto Medical, *Software Engineer Intern*   **Jul. 2019 – Sep. 2019**
Start-up developing and gathering AI applications for medical imaging   *Station F - Paris, France*
- Developed a visualization tool to analyze annotations and results of deep learning algorithms (in AngularJS)
- Discussed with radiologists and data scientists to establish the needs of the tool

NeuroSpin, *Neural Representation of Temporal Sequences (Neuroscience)*   **Aug. 2018 – May. 2019**
Scientific group project at Polytechnique - team of 6 students - 1 day/ week   *Saclay, France*
Goal: Understand how the brain encodes temporal sequences and patterns
- Conceived a grammar encoding of sequences, develop a smartphone app experiment (ReactJS), analyzed the results
- Nominated for best project (top 10%)

Military Experience - Prytanée National Militaire, *Section Head*   **Sep. 2017 – Apr. 2018**
School and preparatory class for future officers in the French army   *La Flèche, France*
- Led 2 sections of 25 students and conducted Physics and Chemistry courses and exercises

PUBLICATIONS

Publications as first author

Functional Invariants to Watermark Large Transformers,   **September 2023**
Pierre Fernandez, Guillaume Couairon, Teddy Furon, Matthijs Douze
Pre-print (under review)

Three Bricks to Consolidate Watermarks for Large Language Models,   **August 2023**
Pierre Fernandez, Antoine Chaffin, Karim Tit, Vivien Chappellier, Teddy Furon
International Workshop on Information Forensics and Security (WIFS)

The Stable Signature: Rooting Watermarks in Latent Diffusion Models,   **March 2023**
Pierre Fernandez, Guillaume Couairon, Hervé Jégou, Matthijs Douze and Teddy Furon
International Conference on Computer Vision (ICCV)

Active Image Indexing,   **October 2022**
Pierre Fernandez, Hervé Jégou, Matthijs Douze and Teddy Furon
International Conference on Learning Representations (ICLR)

Watermarking Images in Self-Supervised Latent Spaces,   **May 2022**
Pierre Fernandez, Alexandre Sablayrolles, Teddy Furon, Hervé Jégou and Matthijs Douze
International Conference on Acoustics, Speech and Signal Processing (ICASSP)

Other publications

A Handbook of Self-Supervised Learning,   **March 2023**
Randall Balestriero et al.
CoRR, arXiv

DINOv2: Learning Robust Visual Features without Supervision,   **March 2023**
Maxime Oquab et al.
Transactions on Machine Learning Research (TMLR)

TECHNICAL SKILLS

Languages   French, Spanish (Working proficiency), English (Working proficiency: TOEFL 110/120 - TOEIC 970/990)
Programming   Python (PyTorch, Jax, Taichi), JavaScript (React, AngularJS, ThreeJS, D3), HTML, SQL[-], C++[-], Java[-]

ADDITIONAL INFORMATION & EXTRACURRICULAR

Sport   Tennis, Climbing, Running
Education   Maths oral examiner (2h/week) at Stanislas in 2018-2019 & Correction of algebra final exams in May 2018
Social action   I was president of a school organization that organized a humanitarian trip to Tahiti
                One-and-a-half-month summer humanitarian internship in Papeete at FACE Polynesia
School clubs   I was vice-president of the graphic design organization of Polytechnique
                I organized of a discovery trip to state-of-the-art Israeli start-ups, universities and R&D centers