Martin Van Waerebeke

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PhD candidate – Privacy-preserving ML: certified unlearning, differential privacy, federated learning
ICML/AISTATS publications; PyTorch research implementation and evaluation; Transformer-based NLP

Selected Publications

[1] **M. Van Waerebeke** et al., Variance-Reduced (ε, δ)-Unlearning using Forget Set Gradients, **ICML'26**.
[2] **M. Van Waerebeke** et al., When to Forget? Complexity Trade-offs in Machine Unlearning, **ICML'25**.
[3] Y. Fraboni*, **M. Van Waerebeke*** et al., SIFU: Sequential Informed Federated Unlearning, **AISTATS'24**.

Research Experience

PhD Candidate — Machine Unlearning & Optimization Jan 2024 – Sep 2027 (expected)
INRIA Paris, ARGO Team *Paris, France*

- **Certified unlearning:** Designed VRU, a principled method transferring the empirical speedups of gradient-ascent unlearning to the certified setting; achieved 30× **lower loss** than prior state-of-the-art methods at the same compute budget. [1]
- **Optimization theory:** Established the first minimax computation-time bounds for unlearning versus retraining. [2]
- **Federated learning:** Developed SIFU, a federated unlearning method providing forgetting guarantees for FedAvg. [3]
- **LLM pre-training** (ongoing): bilevel optimization methods for data mixture estimation in pre-training.

Research Intern — Semi-Supervised Medical Imaging Sep 2021 – Mar 2022
École de technologie superieure (LIVIA Lab) *Montréal, Canada*

- **Implementation and evaluation:** Implemented five state-of-the-art semi-supervised 3D segmentation methods from scratch in **PyTorch**; benchmarked them on a **GPU cluster**.
- Published **2 first-author papers** (MICCAI Workshop *Spotlight* + CNPRM) on an uncertainty measure for **self-supervised 3D segmentation**, correcting entropy-based failures in multi-class settings.

Research Assistant — Image Reconstruction & Inverse Problems Oct 2019 – Jul 2023
CVN, CentraleSupélec *Paris, France*

- Built a **Plug-and-Play deep denoiser** for image reconstruction; published in *PNAS Nexus*.

Applied ML Experience

Data Science Intern — NLP & Forecasting Feb 2021 – Jul 2021
Industry projects via Paris Digital Lab *Paris, France*

- **Taptrove Ventures**: Built a **Transformer-based** system for financial data mining, question answering and classification, reducing annotation time **fivefold**.
- **Ministere des Armees**: Built **low-resource short-text classifiers** with word embeddings, clustering and ontologies.
- **Saint-Gobain**: Built construction-site demand forecasts with LSTM, SARIMAX and VAR, using field-expert input.

Technical Skills

Research: Machine unlearning, privacy-aware ML, model memorization, (non)-convex optimization, LLM pre-training
Implementation: Python, PyTorch, NumPy, scikit-learn, Git, Linux
Compute: HPC clusters (SLURM), multi-GPU training

Education

PhD Candidate — INRIA Paris / ENS Paris Jan 2024 – Sep 2027 (expected)
ARGO Team; advisors: K. Scaman, M. Lorenzi, G. Neglia

Master's (M2) MVA, with Honors 2022 – 2023
ENS Paris-Saclay; Deep Learning, Optimization, Computer Vision

CentraleSupelec — Master of Engineering, Université Paris-Saclay 2019 – 2023

Awards, Service & Outreach

Best Contributed Talk Award — Recent Advances in ML, Aussois Autumn School (2025)
Invited talks — Vector Institute (2026); EUROPT Conference and Borelli Center (2025)
Reviewing — ICML 2026 Gold Reviewer; IEEE TDSC reviewer
Teaching — Deep Learning, ENS Paris M1 CS; Probability & Statistics for ML, DSTI Executive Masters
Popular Science — Article in *The Conversation* (2024); interview in *Sciences et Avenir* (2025)