# Didier Merk

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Citizenship: Netherlands

## Summary

- Master of Science in Artificial Intelligence from University of Amsterdam *(GPA: 8.2/10)*.
- Former intern at **CERN** (Cloud Computing team) and **ING Bank** (Wholesale Banking Advanced Analytics team).
- *Strengths & stack*: Python, PyTorch, Kubeflow, Spark/Azure; experience across time series analysis, fine-tuning LLM architectures for forecasting, deep learning, CV, and NLP; teaching experience as Graduate TA.

## Education

**University of Amsterdam**
*MSc in Artificial Intelligence* — *Sep. 2022 – Sep. 2024*

- GPA 8.2/10; Thesis "Rethinking Models and Evaluations for Time-Series Forecasting".
- Core focus on advanced Machine- and Deep Learning, Computer Vision, NLP and Information Retrieval.
- Graduate TA, Game Theory: co-led MSc tutorials on strategic interaction and equilibria.
- **Published research:** reproduced and extended *LASSI*, a deep-learning method for certified individual fairness, using generative deep neural network *GLOW*; open-sourced and accepted at NeurIPS workshop 2023.

*BSc Major in Artificial Intelligence* — *Sep. 2020 – Jul. 2022*

- Thesis "Hyperparameter Optimization for Jet Tagging" at the CMS experiment at CERN (grade 8.5).
- Focus on machine learning, logic, data structures & algorithms and mathematical foundation courses.

## Experience

**ING Bank** — *Amsterdam, NL*
*Machine Learning Intern* — *Jan. 2024 – Dec. 2024*

- Researched the use of pre-trained transformers and LLM architectures in the domain of financial time-series forecasting for the Wholesale Banking Advanced Analytics team; engineered end-to-end forecasting pipelines.
- Findings resulted in master thesis, an **invited talk** at **ING's DSCC 2024** and directly influenced the team's research roadmap.

**CERN** — *Geneva, CH*
*Research Scientist Intern* — *Mar. 2022 – Jul. 2022*

- Designed a hyperparameter optimization study to improve the Particle Transformer model used to classify proton-proton collisions at the CMS detector.
- Worked for the Cloud Computing team; executed experiments on their novel Kubernetes' Kubeflow platform and documented the improved model results in my bachelor thesis.

## Publications

**[Re] Study of "Latent Space Smoothing for Individually Fair Representations"** — **Rescience C** *2023*
***Didier Merk***, Denny Smit, Boaz Beukers, Tsatsral Mendsuren - 10.5281/zenodo.8173725

## Skills

**Algorithm Design:** Design of end-to-end machine learning projects; large-scale data analysis; evaluation and statistical validation; optimization of machine learning models.
**Coding:** Python (PyTorch, NumPy, scikit-learn, neuralforecast), C, R, SQL, web development (HTML/CSS/JS); tooling: Git, Docker, Jupyter, LaTeX/Markdown
**Math & Theory:** Linear Algebra, Calculus, Bayesian Statistics and Game Theory; foundations across Deep Learning, Computer Vision, NLP and Information Retrieval.

## Projects

**An Improvement on 'Guiding Text-To-Image Diffusion Model Towards Grounded Generation'** *github.com/didiermerk/grounded-diffusers*

- Extended a grounded text-to-image diffusion system (Stable Diffusion) that outputs both an image and masks for the objects named in the prompt; built a plug-and-play pipeline with simple prompt design and regularized training, improving the mIoU score by **4%** using only **25%** of the data and **generalizing better** to unseen classes.
- Tools used: Python, PyTorch, HuggingFace Diffusers, CLIP, Stable Diffusion 1.5/2.0, CUDA (TITAN RTX).

**Exploring Improvements for Medical Imaging on SegTHOR Dataset** *github.com/raoulritter/ai4mi*

- Designed a reproducible pipeline for the segmentation of thoracic organs in CT scans. Improved the 3D-Dice score through preprocessing, data augmentation and model optimization by **18%** compared to the baseline ENet model.
- Tools used: Segmentation models (ENet, VM-Unet, SAM2); .NIfTI, 3D Slicer; Weights and Biases (wandb) sweeps.

## Other activities

- Mentor a weekly class session, which helps secondary students facing educational and socioeconomic barriers with their homework, study habits and exam preparation and provides them with a warm meal.
- Fun fact: Performed at a sold out Royal Theater Carré in Amsterdam.
- Travel and sports enthusiast; football and fitness; outdoor sports climbing belay certified.
- Made a YouTube channel as a teenager with videos reaching tens of millions of views across all platforms.