Simon **Roburin**

Ph.D. in Artificial Intelligence

20 rue Cail, 75010, Paris, France

(+33) 6 09 35 22 34 | simon.roburin@gmail.com | https://kdoublerotor.github.io/personal-homepage/ | simon-roburin

Summary

I completed my Ph.D. in November 2022 at Ecole Nationale des Ponts et Chaussées Paris Tech (machine learning, optimization, and computer vision department) and valeo.ai (international research center in artificial intelligence applied to autonomous driving). In addition to my Ph.D., I hold an M.Sc. in Management and Machine Learning which has enabled me to maintain strong ties with the industry. Following my Ph.D., I joined EPFL as a postdoctoral researcher, where I worked on deepening our understanding of vision-language models and their training methodologies. Currently, I am a postdoctoral researcher at Sorbonne Université, within the LPSM lab, where I focus on enhancing the efficiency and privacy of large language models (LLMs). Alongside my academic work, I also lead the scientific direction of consulting projects for various industry partners.

Education

Ecole Nationale des Ponts Paris Tech (ENPC)

Champs sur Marne, France

Top three engineering school in France - Ph.D. in Artificial Intelligence *2019 - 2022*

- Under the supervision of M. Aubry (ENPC), P. Pérez (valeo.ai) et R. Marlet (valeo.ai).
- Subject: Optimization of deep neural networks: a functionnal perspective.
- Keywords: optimization; machine learning; computer vision, deep learning.

Ecole Centrale Paris

Paris, France

Top three engineering school in France - Majoring in applied mathematics *2013 - 2017*

- B.S. in General Engineering & Management and M.Sc. in Machine Learning.
- Top 10 of the class (GPA: 3.9).
- Courses: Machine Learning, Stochastic Calculus, Computer Science, Management, Leadership, Physics, Biology, Philosophy, Economy. Full courses list here.

Université de Paris

Paris, France

B.S. in Mathematics *2011 - 2013*

- Obtained with highest honors. Valedictorian of the class: 1st / 260.
- **Courses:** measurement theory; topology; differential calculus; probabilities; algebra. Full courses list here.

Honors & Awards

2013 **The Foundation Sciences Mathematiques de Paris (FSMP),** each year the foundation grants a **k€26** master scholarship to the **top 10 best mathematics students in France**. *Paris, France*

Papers

Conferences & Journals

- **Privacy Amplification by Missing Data in Machine Learning**. **S.Roburin**, E. Scornet and R. Pinot.
  - Submission at International Conference in Machine Learning (ICML) 2026.
- **Retrieval-Based Interleaved Visual Chain-of-Thought in Real-World Driving Scenario**. **S.Roburin**, C.Corbière, S.Montariol, A.Alahi and A.Bosselut.
  - Poster at workshop in Vision, Language, and Embodied AI (SpaVLE) at NeurIPS 2025.
- **Pedestrian Action Recognition with Contrastive Vision-Language Models.** C.Corbière, **S.Roburin**, and A.Alahi.
  - Submission at Transportation Research Part C: Emerging Technologies (TRC) 2024.
- **Get One Gram of Neural Style Features, Get Enhanced Group Robustness. S.Roburin**, C.Corbière, G.Puy, N.Thome, M.Aubry, R.Marlet and P.Pérez.
  - Poster at workshop on out of distribution detection at European Conference on Computer Vision (ECCV) 2022.
- **A Spherical Perspective on Learning with Batch Normalization. S.Roburin**, Y.Mont-Marin, A.Bursuc, R.Marlet, P.Pérez and M.Aubry.
  - Spotlight at workshop on optimization at Neural Information Processing Systems (NeurIPS) 2021.
- **A Spherical Perspective on Learning with Normalization Layers. S.Roburin**, Y.Mont-Marin, A.Bursuc, R.Marlet, P.Pérez and M.Aubry.
  - Published as a journal article at Neurocomputing 2022.

- **Localizing Objects with Self-Supervised Transformers and no Labels**. O.Siméoni, G.Puy, H.Van Vo, **S.Roburin**, S.Gidaris, A.Bursuc, P.Pérez, R.Marlet and J.Ponce.
  - British Machine Vision Conference (BMVC) 2021.

Talks

- **Implicit reuglirization in deep learning & enhancing Vision Language Models' reasoning.**
  - Seminar at LIS lab at Aix Marseille Université, 2025.
- **How to train your large language models ?**.
  - Tutorial at EPFL NLP Lab, 2024.
- **A functional perspective on deep learning optimisation.**
  - Research seminar of Visual Intelligence for Transportation Lab at EPFL, 2023.
- **Impact of normalization layers on optimization**.
  - Seminar on Deep Learning Theory organized by the Groupement de Recherche Information, Signal, Image et Vision (GdR ISIS) of CNRS, 2021.

Skills

Languages English (TOEFL ibT 620), French (natif), Spanish (intermediate).
Software Python (proficient), Docker, Github, HTML, CSS, SQL, VBA.
Libraires Pytorch, Tensorflow, Keras, Numpy.

Experience

Sorbonne Center for Artificial Intelligence (SCAI) *Paris, France*
Postdoctoral researcher. *Feb. 2025 - Now*
- Submited articles on improving privacy and training efficiency of machine learning models.
- Led an industry collaboration with Beink to develop frugal adaptations of diffusion models.
- Co-scientific lead on an ANR proposal with SUEZ for robust detection of rare and hazardous objects in automated waste-sorting; submitted, decision pending.

Ecole Polytechnique Fédérale de Lausanne *Lausanne, Switzerland*
Postdoctoral researcher. *Oct. 2023 - Jan 2025*
- 70h of management of student projects (bachelor and master).
- Submitted articles in international journals and conferences.
- Leading R&D project with Innosuisse: real-time tracking of hockey players.

TW3 Partners *Paris, France*
Artificial Intelligence expert. *Jan. 2023 - Now*
- Scientific direction of consulting projects.
  - Human ressources: design of a large language based pipeline that suggests the best CVs for a given job offer.
  - Electricity provider: extraction and classification of test reports of specific materials into a structured database.
  - Network operator: encrypted training pipeline of neural networks on highly confidential data.

valeo.ai *Paris, France*
Junior research scientist in deep learning - International research center in Deep Learning for automotive. *Mar. 2019 - Oct. 2022*
- Management of research projects involving senior research scientists.
- Accepted articles at international conferences (BMVC 2021, NIPS 2022, ECCV 2022) and journals (Neurocomputing).
- Creation and management of the weekly deep learning working group with the participation of Ph.D. students and senior researchers.

Aquabyte *San Francisco, United States, CA*
Deep Learning Engineer - Startup applying machine learning to aquaculture *Jun. 2018 - Jan. 2019*
- Management of the underwater data acquisition team in Norway.
- Creation of a biomass estimation algorithm for fishes from underwater images integrating uncertainty estimation.
- Creation of an algorithm to automatically detect parasites on fishes from underwater images.

Prophesee *Paris, France*
Deep learning intern researcher - Startup developing neuromorphic vision system with event based cameras. *Dec. 2017 - Jun. 2018*
- Creation of a recurrent neural network architecture to handle asynchronous time series of sparse images produced by the event based camera.
- Work on unsupervised algorithm for gesture detection in Renault cars using datas from the event based camera.

Bouygues Telecom datalab *Paris, France*

Part time Data scientist - Top 3 french mobile network provider. *Sept. 2016 - Mar. 2017*

- Improvement of customer's behavior model with a NLP approach.
- Development of automatic scraping bots to parse online medias and social networks.

Yubo app *London, United Kingdom*

Data Scientist Intern - Well funded startup, 25M users, social network. *Feb. 2016 - Jun. 2016*

- Development of semi-supervised computer vision algorithm to perform moderation of live streamed videos.
- Creation of a scoring model to detect aggressive behavior.

SMG Crédit Suisse. *Paris, France*

Quantiative Intern - Trading algorithmic desk *Sep. 2015 - Jan. 2016*

- Creation of a back test tool to evaluate trading strategies following index re balancing.
- Creation of a successful automated trading strategy using feature extraction and clustering methods.

Teaching

Sorbonne Université *Paris, France*

Lecturer *2025-2026*

- **Prédire, comprendre, visualiser - introduction au Machine Learning par l'approche linéaire:** teaching unit (UE) for bachelor students. I designed and delivered lectures, tutorials (TDs), and lab practicals (TPs) as well as developed all course materials and assessments.

Ecole Polytechnique Fédérale de Lausanne *Lausanne, Suisse*

Teaching assistant *2023-2024*

- **Introduction to machine learning for engineers:** course for bachelor or master students (24h: 12h per semester).

Ecole Nationale des Ponts et Chaussées Paris Tech *Champs sur Marne, France*

Teaching assistant *2019 - 2022*

- **Deep Learning:** course for master student majoring in applied mathematics (27.5h: 15.5h per semester).
- **Machine Learning:** course for master student majoring in applied mathematics (15h: 7.5 hours per semester).

Interests

Sports Boxing, Grappling, Hiking, Climbing, Running.

Others Geopolitics, Litterature, Philosophy, Piano (18 years) classical and jazz music.