Romain Séailles

github.com/RSLLES Romain Séailles

PhD student in Computer Vision and Machine Learning, exploring applications of Deep Learning for Super-Resolution Microscopy.

Education

PhD in Machine Learning & Computer Vision — École normale supérieure - Ulm Paris, France
Supervised by Pr. Julien Mairal and Pr. Jean Ponce. 2024 –Present
My work combines data-driven approaches with conventional super-resolution microscopy techniques to create physically constrained Deep Learning models. These hybrid architectures enable faster and more accurate super-resolution while ensuring reliable, robust and interpretable results, which are critical attributes for biologists.

Master of Science "*MVA*" — École normale supérieure - Paris-Saclay University Paris, France
Internationally renowned MSc in Mathematics, Computer Vision, and Machine Learning. 2022 –2023
Completed Courses on *Computational Statistics*, *Reinforcement Learning*, *Image Generation with Deep Learning Models*, *Natural Language Processing*, *Kernel Methods for Machine Learning*.

Master of Engineering "*Ingénieur Civil*" — Mines de Paris - PSL University Paris, France
Elite French university with selective admissions, world-class research, and global partnerships. 2019 –2023
Coursework focused on *Statistics*, *Machine Learning*, *Computer Vision*, *Signal Processing*.

Experience

Inria - Thoth Team — *Research Engineer* Grenoble, France
Conducted Deep Learning research in Microscopy Super-Resolution. 2023 –2024 (9 months)
- Explored constrained deep learning techniques for scientific applications with a focus on Fluororescence Microscopy.
- Administered and maintained Thoth's GPU computing cluster (76 GPUs on 31 nodes).

French Ministry of Defence — *R&D Scientist in Information Retrieval* Paris, France
Conducted research in *Content-Based Image Retrieval* (CBIR) for large-scale datasets. 2023 (6 months)
- Proposed a new CBIR architecure combining DINOv2 with modules from other CBIR architectures (DOLG, DELG, DPLG) - surpassing state-of-the-art performance (confidentiality constraints prevented formal publication).
- Developed domain-specific models optimized for (buildings, logos, vehicles, etc.) processing up to 1B images efficiently.

Kinetix (AI startup) — *R&D Scientist in 3D animations* Paris, France
Conducted research in Deep Learning models to extract 3D animations from 2D videos. 2022 (6 months)
- Developed a latent space model for 3D human movements using variational autoencoders.
- Trained a reinforcement learning agent in this latent space, enabling animation denoising and procedural generation.
- Deployed models in production for real-time animation processing.

BUF Compagnie — *R&D Scientist in Computer Graphics* Paris, France
Conducted research and developed new features for BUF's VFX software suite. 2021 (6 months)
- Implemented state-of-the-art methods for Optical Flow Estimation, Ultra-fast Segmentation into Super Pixels and Video Tracking by Optical Flow. All methods are adapted to align with Hollywood's rigorous standards.
- Trained models for Alpha Matte Extraction, marking the first integration of Deep Learning tools in BUF's workflow.

Skills

Machine Learning: Expert in *PyTorch*, *Scipy*, and *Pandas*. Skilled with *Lightning (Fabric)* and *Hydra*.

Programming Tools: Expert in *Python* and *C++* (17). Skilled with *JavaScript* (*reveal.js*).

Environment & Workflow: Daily use of *VSCodium*,*Git*, *Bash*, *Slurm*, *Vim*, *Latex*.

Graphic design: Mastery of *Adobe Premiere Pro*, *Adobe After Effect* and *Adobe Photoshop*.

Languages

- **French:** Native
- **English:** Fluent

Hobbies

Enjoy swimming, cycling, and running (currently training for a triathlon in summer 2025). I also practice rock climbing, sailing, and skiing.

Avid hiker: Always looking for outdoor adventures.

Board Games: Passionate about strategic board games like Spirit Island, Dune Imperium, Terraforming Mars, Unlock, etc.

Tech Projects: Built a home server using Raspberry Pi, and currently working on an Arduino-based electronic party game.

Photography: Enthusiast of color theory, photography, and cinematography.