Gaspard BEAUDOUIN

Machine Learning research student

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Research interests: Flow Matching, Representation Learning, World Models, VLMs, Masked Diffusion Language Models ...

Experience

Research Intern — Harvard University Boston, MA, USA
Harvard AI and Robotics Lab, MEE *Feb 2025 – Aug 2025*

- Conducted research under Dr. M. Wang on generative modelling and flow matching. Proposed DVRF, an inversion-free flow matching framework for text-to-image editing (*CVPR 2026 under review*), and Co-authored *SplitFlow* (*NeurIPS 2025*) for flow aggregation.
- Co-authored *PAGE-4D* (*ICLR 2026 under review*) for pose and geometry estimation of dynamic scenes; now working on Masked Diffusion Language Models with a Harvard PhD student.

ML Engineer Intern — Sinequa Paris, France
Research Team *Aug 2024 – Jan 2025*

- Studied LLMs and tool-use agents (SFT and RL); designed evaluation for function-calling models (BFCL), data augmentation and templating.
- Distributed instruction fine-tuning (LoRA and full) and DPO on H100 clusters for tool-use; Docker and Slurm.

Publications

Delta Velocity Rectified Flow for Text-to-Image Editing *Under Review at CVPR 2026, Preprint: 2509.05342.*
G. Beaudouin, M. Li, J . Kim, S.-H. Yoon, M. Wang

PAGE-4D: Disentangled Pose and Geometry for 4D Perception *Under Review at ICLR 2026, Preprint 2510.17568.*
K. Zhou, Y. Wang, G. Chen, G. Beaudouin, F. Zhan, P. Liang, M. Wang

SplitFlow: Flow Decomposition for Inversion-Free Editing Accepted at NeurIPS 2025.
S.-H. Yoon, M. Li, G. Beaudouin, C. Wen, M. Azhar, M. Wang

(In preparation: Masked Diffusion Language Model) Work with J . Kim.

Education

École Normale Supérieure Paris-Saclay Paris, France
MVA Master — Mathematics, Vision, Learning *2025 – 2026*

- Coursework: Advanced learning for text/graphs, DL, Optimal Transport, Probabilistic Graphical Models, Large-Scale LLM Training, Deep Learning theoritical foundations, Multimodal xAI, Generative Modelling, RL, LLM for code and proof.

École Nationale des Ponts et Chaussées — Institut Polytechnique de Paris Paris, France
Mathematics and Computer Science Department *2022 – 2026*

- Focus: Deep Learning, Machine Learning, Computer Vision, Statistics, Convex Optimization, Stochastic Processes, Advanced Progamming, Control Theory and Functional Analysis.

Fénelon Sainte-Marie Paris, France
Preparatory Classes in Mathematics and Physics *2020 – 2022*

- 1st Year: PCSI; 2nd Year: PSI* (Physics, Mathematics, Engineering Sciences).

Projects

GPT MoE Transformer from Scratch Personal Project
Implemented and trained a PyTorch MoE Transformer in order to generate French poetry with some GPT-OSS recent techniques. I also generated some synthetic training data, and wrote my notes on LLMs: From Pre-Training to RLHF (Draft) *2025*

Mini GRPO Personal Project
Reimplemented GRPO, from by DeepSeek-R1 and DeepSeekMath, applied to math reasoning tasks. *2025*

Drug Design with Diffusion Models École des Ponts
Implemented DDPM, explored DiffDock for drug binding discovery (with Sanofi). Poster Available. *2024*

Edge Detection in Images École des Ponts
C++ research on perceptual boundary saliency; implemented detection algorithms. *2022*

Skills

Languages French (native), English (fluent), Spanish (proficient)

Technical Python (PyTorch, Transformers), Docker, Slurm, C++, SQL, R, LaTeX

Miscellaneous

Sports École des Ponts football team; competitive tennis

Interests Passionate about ML research, actively following scientific publications