

Joanna Wolski

Robotics & Machine Learning EPFL Engineer

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Research-driven Machine Learning and Robotics Engineer focused on deploying foundation models in real-world robotic systems. Experience across leading research labs including Mila, Harvard, and EPFL.



Experience

Research Collaborator — MILA Quebec Artificial Intelligence Institute Feb 2026 – Present
Prof. Chris Pal's Group

- Developed a robotic guide dog system for assistive navigation in real-world environments for visually impaired users.
- Designed a multimodal perception system on a Unitree Go2 quadruped robot, integrating IMU, LiDAR and vision with Vision-Language Models (VLMs) for semantic scene understanding and spatial reasoning.
- Trained Reinforcement Learning (RL) policies for goal-directed locomotion and obstacle avoidance in unstructured environments, focusing on model robustness and generalization.
- Built end-to-end robotics pipelines using PyTorch for autonomous robotic system, including sensor fusion, mapping, control, and hardware deployment.

Visiting Student Researcher — Harvard SEAS, Slade Lab Mar 2025 – Oct 2025

Supervised by Prof. Patrick Slade (Harvard) & Prof. Mohamed Bouri (EPFL)

- Conducted research on wearable robotic exoskeletons to reduce human metabolic cost during overground walking.
- Developed IMU-based control algorithms implemented on STM32 microcontrollers for real-time actuation of active hip and passive ankle exoskeleton systems, to enable seamless, data-driven interaction between human movement and robotic actuation.
- Modeled human behavior by collecting and analyzing large-scale multimodal biomechanical datasets, including motion capture, EMG, force plates, and metabolic systems.

Data Science Intern — Chanel, Watches and Fine Jewelry Division Sep 2024 – Mar 2025
Geneva, Switzerland

- Engineered forecasting models for supply chain optimization using clustering and time-series analysis, addressing cannibalization and last-piece assortment.
- Developed a computer vision pipeline for product recognition and classification, implementing CNN architectures for object detection in TensorFlow.
- Designed and automated end-to-end ML pipelines for model deployment and orchestration within the Azure Databricks ecosystem.

Student Researcher — EPFL, MOBOTS Lab Autumn 2023

Supervised by Prof. Mondada (EPFL) & Prof. Bumbacher (HEP Lausanne)

- Developed an Abstract Syntax Tree (AST)-based machine learning framework in Python to analyze student programming strategies in computational thinking tasks from the Programme for International Student Assessment (PISA).
- Modeled structured program representations to classify strategies, detect errors, and infer behavioral patterns.
- Generated automated feedback providing actionable learning recommendations based on inferred strategies.

Teaching Assistant — EPFL Autumn 2023

MSc course: Basics of Mobile Robotics (Prof. Mondada)

- Supported MSc students during lab sessions and project work on perception, localization (Kalman Filtering), and navigation (path planning, obstacle avoidance) using the Thymio mobile robot platform.

Education

Master Thesis, Slade Lab Mar 2025 – Oct 2025
Harvard University, John A. Paulson School of Engineering and Applied Sciences, USA
Grade: 6.0/6.0

M.Sc. in Robotics and Data Science Sep 2022 – Oct 2025
EPFL Swiss Federal Institute of Technology Lausanne, Switzerland

Bachelor Exchange (3rd Year) Sep 2021 – Sep 2022
Karlsruhe Institute of Technology (KIT), Germany

B.Sc. in Microengineering Sep 2018 – Sep 2022
EPFL Swiss Federal Institute of Technology Lausanne, Switzerland

Technical Skills

- **Programming:** Python, C/C++, MATLAB, SQL
- **Deep Learning Frameworks:** PyTorch, TensorFlow
- **Data & ML Tools:** Pandas, NumPy, OpenCV, Scikit-learn, Matplotlib, Seaborn, MLflow, TensorBoard
- **Development Tools:** Git, Linux, Docker
- **Machine Learning:** Classification, Clustering, Regression
- **Cloud / ML Systems:** Azure (Databricks, DevOps)
- **Embedded Systems:** STM32 microcontrollers
- **AI:** Natural Language Processing (NLP), Vision Language Models (VLMs)
- **Robotics:** Sensor fusion, SLAM, mapping, control systems, reinforcement learning, autonomous navigation, motion planning, obstacle avoidance
- **Experimental Systems:** Motion capture (Qualisys), EMG, force plates, metabolic analysis (COSMED)
- **Design & Fabrication:** CATIA, Fusion 360, 3D printing, CNC milling, laser cutting

Additional Projects

- **Aerial Robotics:** Engineered an autonomous navigation system for a quadrotor drone utilizing SLAM and Visual-Inertial Odometry. Developed and tuned flight controllers in simulation before successful deployment on physical hardware for real-world testing. Implemented Path Planning algorithms and trajectory tracking controllers, ensuring stable flight and precise navigation through planned waypoints.
- **Mobile Robotics:** Developed a differential-drive autonomous system implementing Global and Local Path Planning with dynamic Obstacle Avoidance. Implemented Extended Kalman Filters (EKF) for robust State Estimation and sensor fusion, optimizing localization accuracy in cluttered environments.
- **Computational Motor Control:** Simulated bio-inspired open- and closed-loop control architectures in MuJoCo for amphibious robotic systems with adaptive gait switching based on terrain (land vs. water).
- **Haptic Human–Robot Interfaces:** Designed and implemented a PID-controlled haptic interface driven by electromyography (EMG) signals for real-time human–robot interaction.
- **Natural Language Processing:** Fine-tuned Meta’s Llama foundational models using Direct Preference Optimization (DPO) and custom classification heads for engineering-specific Q&A and multiple-choice reasoning, significantly improving performance over standard baselines.
- **Deep Learning:** Developed robust moderation architectures by investigating adversarial training techniques to detect unsafe content; engineered a deep learning model that outperformed baseline systems in identifying complex adversarial inputs.
- **Image Analysis and Pattern Recognition:** Developed a computer vision pipeline for automatic detection and re-clustering of puzzle pieces in heterogeneous scenes, leveraging feature extraction and data-driven clustering methods.
- **Model Predictive Control:** Designed a model predictive control (MPC) system in MATLAB to simulate and stabilize rocket flight dynamics following a predefined trajectory.

Languages

English (C1), French (Mother tongue), Polish (Fluent), German (B2)