

Nicolas Pfitzer

MSc Robotics, Systems and Control | Bachelor of Microengineering

📍 Swiss & US Citizen
📍 Cambridge, United Kingdom
✉️ nicolas@pfizer.org
linkedin.com/in/nicolas-pfizer

Profile

Robotics and ML engineer
Reinforcement Learning
Computer Vision
Micro-systems and Electronics

Technical Skills

Programming Languages
C++, Python, MATLAB
Machine Learning
PyTorch, TensorFlow
Reinforcement Learning
IsaacLab, TorchRL, VMAS
Robotics , CAD & Electronics
ROS2, Catia, Cadence
Tools
Git, Docker, Linux

Languages

French ••••
English ••••
German ••••○

Personal Interests

Exploring autonomous decision-making and embodied intelligence. Connecting perception, reasoning, and control to create innovative real-world systems.

Last updated: September, 2025.

Education

2023 – Present. Master's Degree in Robotics, Systems and Control

ETH Zurich – Zurich, Switzerland

Jan. 2025 – Present. Master Thesis, University of Cambridge – Cambridge, United Kingdom

2020 – 2023. Bachelor in Microengineering

2020 – 2022. EPFL, Swiss Federal Institute of Technology of Lausanne – Lausanne, Switzerland

2022 – 2023. University of New South Wales – Sydney, Australia
Grade: 5.42/6 (Top 5%)

2017 – 2020. Swiss Matura (French-German Bilingual)

Ecole Moser, Geneva – Switzerland

Specialization: Physics and Applied Mathematics
Completed with honours, Grade: 5.7/6 (Top 5%)

Experience

Feb. 2025 – Sept. 2025 Student Researcher @ ProrokLab - University of Cambridge

Multi-Agent Reinforcement Learning - Collaborative and Language Driven Multi-Agent Teams.

Sept. 2024 – Jan. 2025 Student Researcher @ Robotic Systems Lab - ETH Zurich

Multi-Task Reinforcement Learning for Material Handling - Partnered with Liebherr

Feb. 2024 – Aug. 2024 Computer Vision Engineer Intern @ Shape Labs Inc. - San Francisco

Developed high-impact software solutions at the intersection of computer vision, machine learning, and 3D graphics. YCombinator Pioneer Internship Program.

Aug. 2021 – Jul. 2022. Power System Engineer @ EPFL Spacecraft Team

Student Aerospace organization at EPFL building CubeSats. Orbital simulations, Designed and optimized solar-panel deployment.

Publications

Nicolas Pfitzer, et al. Prompting Robot Teams with Natural Language and Automata. Submitted to IEEE International Conference on Robotics and Automation (ICRA), 2026.

MR.NAVI: Mixed-Reality Navigation Assistant for the Visually Impaired.
Accepted at the CV4MR Workshop, CVPR 2025.

Projects Portfolio

Feb. 2025 – Present **Multi-robot Coordination and Reasoning through Natural Language**

ProrokLab - University of Cambridge - Master Thesis

- Investigating how Large Language Models (LLMs), RNNs and Automaton theory can enable intuitive human-robot collaboration by interpreting and executing natural language instructions in multi-robot tasks.
- Work submitted to the IEEE International Conference on Robotics and Automation (ICRA 2026)

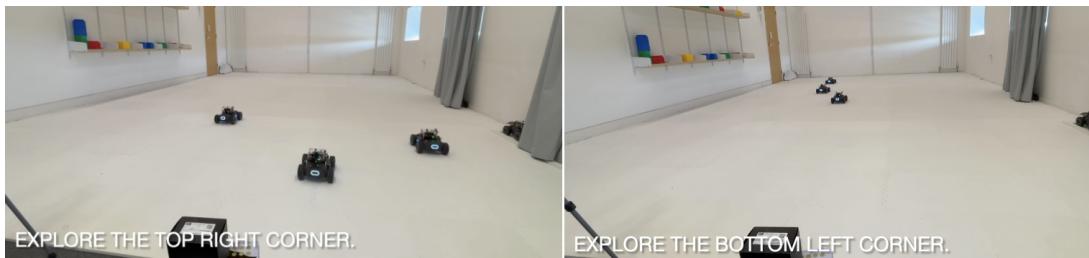


Figure 1: Multi-robot ROS2 Deployment with language-driven exploration.

Sept. 2024 – Jan. 2025 **MR.NAVI: Mixed-Reality Navigation Assistant for the Visually Impaired**

ETH Zurich - Course Project (Team of 4)

- Developed a Mixed-Reality application to support visually impaired individuals in navigating unfamiliar environments.
- Work resulted in a paper accepted to the **CV4MR Workshop at CVPR 2025**.

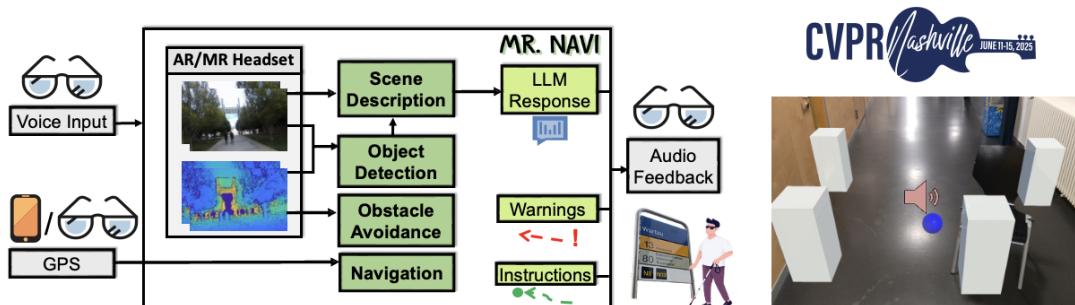


Figure 2: Application Pipeline

Sept. 2024 – Jan. 2025 **Multi-task Reinforcement Learning for Material Handling**

Robotic Systems Lab - ETH Zurich - Semester Project

- In this project, we explored a multitask reinforcement learning (MTRL) framework aimed at learning control strategies for material handling equipment, specifically the Liebherr LH 40.
- We trained a single MTRL policy to efficiently learn and execute three key tasks in a material handler's workflow: point-to-point navigation, waypoint tracking, and dynamic throwing.

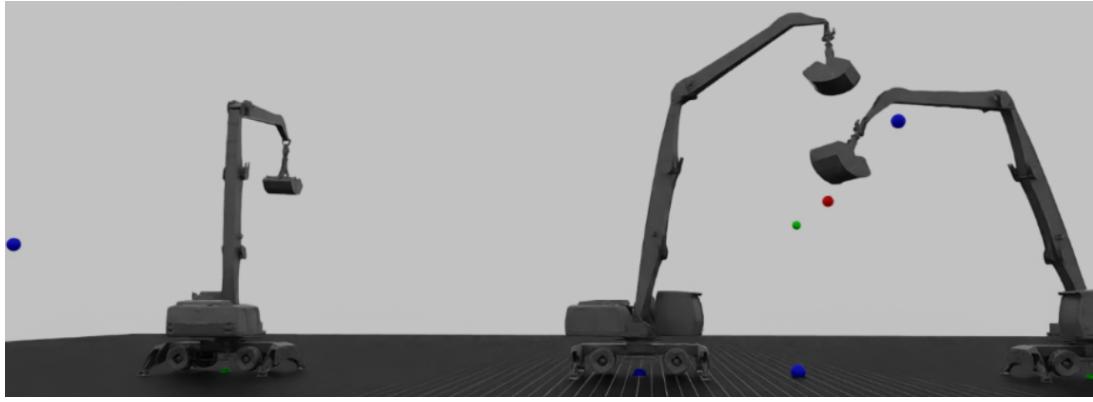


Figure 3: Simulated roll-out of a multi-task material handling policy.

Sept. 2023 – Dec. 2023 **A Dexterous Low-Cost Tendon-Driven Biomimetic Robotic Hand with Novel Snap-fit Pin Joints**

ETH Zurich - Course Project (Team of 5)

- Developed a tendon-driven robotic hand featuring a unique snap-fit pin joint design for simplified assembly and maintenance.
- This robotic hand includes 11 actuated degrees of freedom and leverages a tendon-driven mechanism.
- Key aspects of the project included teleoperation using an optimization-based hand-tracking and re-targeting algorithm, along with the implementation of reinforcement learning policies for executing complex ball rolling tasks, demonstrating its practical functionality in real-world applications.

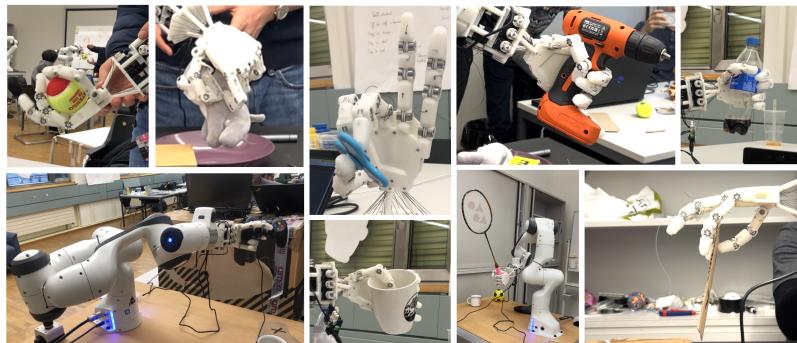


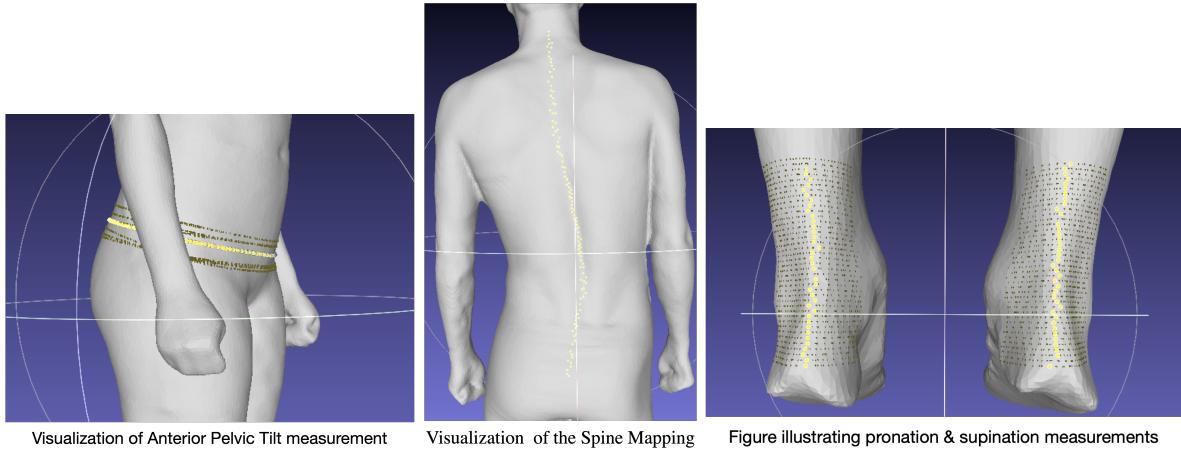
Figure 4: The hand in action.

Feb. 2024 – Aug. 2024 **Computer Vision Projects at Shape**

Shape is a health tech startup backed by Ycombinator and based in San Francisco, California, which has developed a state-of-the-art 3D body scanner allowing users to monitor their overall fitness, body-composition, and much more. Working at Shape, I independently led the development of 3 new Computer Vision pipelines:

- **Posture Analysis**

The project aimed to develop a comprehensive postural analysis framework using whole-body 3D scans to diagnose and manage musculoskeletal disorders. These measurements are performed by analyzing muscle definition, body symmetry, and common physiological markers, all supported by medical literature.



- Rigging 3D Body scans for Animation

I led the development of a novel C++ pipeline to automatically rig and animate any given textured 3D PLY mesh of a human. This pipeline re-targets joint positions from either open-source (ex. Mixamo) or custom animations in gLTF format, ensuring seamless and dynamic animations. The final objective of the project was to create an IOS Demo where the user could seamlessly transition between a variety of different animations fitted onto their own 3D scans.



Figure 5: Snapshots of a Capuera animation 60fps

- Residual Networks for Clothing detection

To guarantee the effectiveness of the Shapescale measurements, users are requested to wear tight-fitting clothing or no clothing during the scanning process. However, customer-data showed that users do not always comply, resulting in erroneous measurements. My approach was to train a deep learning model (ResNet50) to automatically detect when a user was wearing clothing that could destabilize the scanning process. Trained on over 60'000 publicly available images, the ResNet50 network achieved an accuracy of over 98.5%.

Sept. 2023 – Dec. 2023 Bi-directional Rapidly-Exploring Random Trees (B-RRT*) for Enhanced Path

Planning in Obstructed Environments

ETH Zurich - Course Project (Team of 2)

- Developed a high-performance simulation for obstacle navigation using a two-wheeled robot in a dynamic 2D environment.
- Tasked with finding an optimal paths without prior knowledge of other robots, I opted for a

Bidirectional Rapidly Exploring Random Tree approach, which proved highly effective in navigating complex scenarios.

Feb. 2022 – Jul. 2022 High-Efficiency Mechanical Clock with Flexible Mechanics

EPFL - Course Project (Team of 5)

- Developed a high-performance mechanical clock, achieving a theoretical 50% increase in energy efficiency compared to traditional mechanical clocks.
- This innovative timepiece designed with a titanium body and tungsten counter-weights features a unique, flexible-guidance oscillator that replaces the traditional ticking system, significantly reducing energy loss.

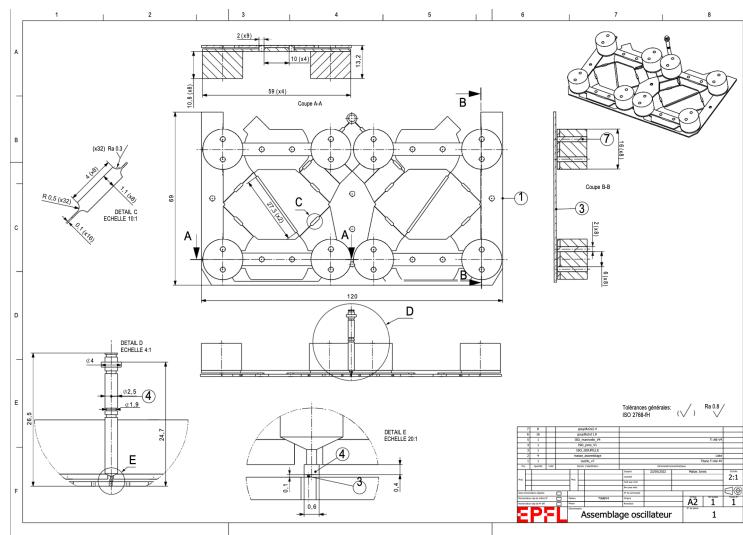


Figure 6: Mechanical Drawing of the Flexible Oscillator