

# Edouard Dufour

Bern, Switzerland | +41 79 838 09 60 | [edouard.dufour@epfl.ch](mailto:edouard.dufour@epfl.ch)  
[Google Scholar](#) | [GitHub](#) | [Website](#)

**PhD researcher developing generative-model and optimization methods for scientific and engineering design.** My background in robotics and mechanical engineering, combined with experience building organizations and leading infrastructure projects, gives me a practical perspective on research and engineering. My experience leading organizations of up to 150 people and teaching has further shaped how I design solutions, with close attention to the people I work with as well as to the people who use them.

## EXPERIENCE

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| <b>CVLAB EPFL, PhD RESEARCHER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 09/2025 – ONGOING<br>LAUSANNE - CH    |
| <ul style="list-style-type: none"> <li>Developing black-box optimization methods for problems with costly or unreliable evaluations, using generative models to exploit structure in the search space.</li> <li>Studying how to separate generative priors from sparse optimization feedback, enabling effective search under extremely limited evaluation budgets.</li> </ul>                                                                                                                                                                                                                                                                                |                                       |
| <b>ROLEX SA, DATA SCIENTIST FOR INDUSTRY 4.0 - INTERN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 08/2024 – 01/2025<br>BIEL/BIENNE - CH |
| <ul style="list-style-type: none"> <li>Built an Industry 4.0 application for high-precision machining from fragmented, noisy production data: data architecture, pipelines, models, and user-facing tools. The goal was to reduce inventory without sacrificing throughput or quality.</li> <li>Found and started new projects by working directly with production teams, including real-time detection of machine drift and failures from machine logs.</li> <li>Worked with technicians and specialists to learn the process and fit tools to their workflows. Delivered applications for routine operational use.</li> </ul>                               |                                       |
| <b>AGEPOLY-LUDOPOLY EPFL, CO-FOUNDER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 07/2023 – 07/2024<br>LAUSANNE - CH    |
| <ul style="list-style-type: none"> <li>Co-founded and launched a campus organization, setting up its governance, funding, partnerships, and team. Organized 30 events with up to 80 participants in its first year.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |
| <b>ETA SA; SWATCH GROUP, MECHANICAL ENGINEER - INTERN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 08/2021 – 09/2021<br>GRENCHE - CH     |
| <ul style="list-style-type: none"> <li>Designed production-machine improvements including a magnetic brake to reduce part damage and measures to correct tool misalignment caused by heat.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |
| <b>EPFL LAUSANNE, TEACHING ASSISTANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 02/2020 – ONGOING<br>LAUSANNE - CH    |
| <ul style="list-style-type: none"> <li>Taught Bachelor's and Master's students in physics, mathematics, computer science, control, and engineering over 10 semesters.</li> <li>Work ranged from course coordination to labs and individual tutoring, adapting explanations to each student's background in French, German, and English.</li> </ul>                                                                                                                                                                                                                                                                                                            |                                       |
| <b>FREQUENCE BANANE, TECHNICAL MANAGER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 02/2019 – 07/2022<br>LAUSANNE - CH    |
| <ul style="list-style-type: none"> <li>Rebuilt the radio's broadcast and IT infrastructure after a critical failure, then engineered a high-availability system for 24/7 broadcasting with redundant servers, automated failover, and a virtual backup studio.</li> <li>Led the relocation and technical redesign of two studios, mobile broadcasting infrastructure, servers, and shared facilities. Worked with EPFL and kept costs low through reuse and targeted upgrades.</li> <li>Built and trained a technical team to run and improve the infrastructure independently, while developing tools and processes for reliable daily operation.</li> </ul> |                                       |
| <b>VARIOUS EVENT ORGANIZERS, EVENT MANAGER AND TECHNICIAN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 09/2015 – ONGOING<br>VARIOUS - CH     |
| <ul style="list-style-type: none"> <li>Worked professionally across sound, lighting, and live-event technical production, from private orchestral performances to major festivals with up to 250,000 attendees across six days.</li> <li>Led organizations of up to 150 staff and volunteers through team leads. Managed safety-critical operations under severe staffing and time constraints with a focus on delegation, novice training and team well-being.</li> </ul>                                                                                                                                                                                    |                                       |

## RESEARCH & PROJECTS

### GENERATIVE REFINEMENT FOR LOW-BUDGET BLACK-BOX OPTIMIZATION

07/2026

E. DUFOUR, P. FUA – CVLAB EPFL

[arXiv preprint](#); under review

- Introduced SPARROW, which keeps a generative prior separate from sparse objective feedback so it can exploit structure during optimization with very few evaluations.

### TEST-TIME GUIDANCE OF DIFFUSION MODELS FOR AERODYNAMIC OPTIMIZATION

07/2025

E. DUFOUR – CVLAB EPFL

Master's Thesis; Supervised by W. Zhen and P. Fua

- Developed and tested gradient-free methods to steer a pretrained diffusion model toward non-differentiable aerodynamic objectives, including a diffusion-guided evolutionary strategy that outperformed the tested baselines.

### BACTERIAL CLASSIFICATION WITH RAMAN SPECTROSCOPY

06/2024

E. DUFOUR – LQNO EPFL

Semester Project; Supervised by M. El Chazli and C. Galland

- Built an ML pipeline for rapid, culture-free bacterial identification from Raman spectra, aimed at earlier food-safety checks and fewer costly recalls.
- Reached 97% species-level accuracy under matched acquisition conditions, but found that measurement repeatability was the main barrier to deployment.
- Early feasibility work preceding the EPFL spin-off Myriad Optics

### DIFFAIRFOIL: AN EFFICIENT NOVEL AIRFOIL SAMPLER BASED ON LATENT SPACE DIFFUSION MODEL FOR AERODYNAMIC SHAPE OPTIMIZATION

01/2024

W. ZHEN, E. DUFOUR, C. PELLETIER, P. FUA, M. BAUERHEIM – CVLAB EPFL

[2024 AIAA aviation forum](#)

- Built the initial DiffAirfoil proof of concept: a latent-space diffusion model that generates valid airfoils and guides them toward high-level design properties.

### MECHANICAL DESIGN AND MOTORISATION OF A RADIO TELESCOPE

06/2021

M. AGUIRIANO CALVO, L. CAYROCHE, E. DUFOUR, C. ROCHET – CALLISTA EPFL; LASTRO EPFL

Bachelor's Thesis; Supervised by P. Muellhaupt

- Co-designed and built a 2 m steerable radio telescope for CHF 2,000, with 2 arcsec positioning resolution and 42 arcsec pointing accuracy. Designed to cover requirements from satellite tracking to deep-space observations.
- Still used for teaching and research at EPFL

## EDUCATION

CVLAB EPFL LAUSANNE, PhD IN COMPUTER AND COMMUNICATION SCIENCES

09/2025 – ONGOING

EPFL LAUSANNE, MSc IN ROBOTICS, MINOR IN DATA SCIENCE

09/2021 – 07/2025

EPFL LAUSANNE, BSc IN MECHANICAL ENGINEERING

09/2018 – 07/2021

## LANGUAGES

- French: Native
- German: Fluent
- English: Fluent

## INTERESTS

- Control Theory & Dynamical Systems
- General Physics & Astrophysics
- Music & Piano
- Ski & Tennis

## SKILLS

- Research & ML: Python, PyTorch, BoTorch, Optuna
- Data: SQL, Spark, Pandas/Polars
- DevOps: Docker, Docker Swarm
- Engineering: C (embedded), MATLAB