Pablo Boitel

Learning-Based Control · Reinforcement Learning · Physical Systems

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M.Sc.A. student in aerospace engineering at ÉTS and research collaborator at Mila, working on robust reinforcement learning for HVAC control. Research interests include control theory, physical modeling, scientific machine learning, and reliable learning-based control for dynamical and safety-critical systems.

Research Experience

Research Collaborator — *Jan. 2026 – Present*
Mila – Quebec AI Institute, Pierre-Luc Bacon's group (pluRL) — Montréal, QC
Robust reinforcement learning for transferable HVAC control across diverse building dynamics.

- Developing learning-based control methods that combine domain randomization, recurrent policies, and physics-informed generative models to improve robustness and generalization.

R&D Intern – Beam Transport Simulation — *Apr. 2025 – Aug. 2025*
French Alternative Energies and Atomic Energy Commission (CEA), EPURE facility — Île-de-France, France
Real-time numerical simulation and accelerator beam transport.

- Developed a real-time, matrix-based electron-beam transport simulator in Python for the EPURE accelerator facility.

Research Intern – Quadcopter Modeling and Control — *Summer 2024*
IMS Laboratory (UMR 5218), CRONE team; supervisor: Tudor-Bogdan Airimitoaie — Bordeaux, France
Multiphysics modeling, nonlinear control, and physics-guided machine learning.

- Modeled quadcopter dynamics and implemented LQI and differential-flatness controllers in Julia/SciML.
- Used physics-guided neural networks to improve the physical model; supported the 12th IFAC Conference on Fractional Differentiation and its Applications (ICFDA 2024).

Publications

P. Boitel and K. Zhang, "Generalizing HVAC Control With Domain Randomized Reinforcement Learning," in *ACM Sustainability Week Companion 2026*, pp. 383–386, 2026. doi: 10.1145/3765611.3815359.

Education

M.Sc.A. in Aerospace Engineering — *Aug. 2025 – Jun. 2027*
École de technologie supérieure (ÉTS) — Montréal, QC
Thesis: advanced control and reinforcement learning for HVAC systems; supervisor: Kun Zhang.

Engineering Degree in Mechanical and Systems Design — *2023 – 2026*
Polytech Tours, University of Tours — Tours, France
Engineering curriculum with a focus on modeling, mechatronics, control, and mechanical design.

B.Sc. in Mathematics — *2020 – 2022*
University of Bordeaux — Bordeaux, France
Fundamental mathematics track.

Classes Préparatoires aux Grandes Écoles (MPSI) — *2019 – 2020*
Lycée Sainte Marie Grand Lebrun — Bordeaux, France
Intensive undergraduate preparation in mathematics, physics, and engineering science.

Teaching and Technical Experience

Mathematics Tutor — *2024 – 2025*
University of Tours and Polytech Tours — Tours, France
Led calculus and linear-algebra tutorials for a cohort of 30 second-year engineering students.

Research Technical Assistant — *2024 – 2025*
Polytech Tours FabLab — Tours, France
Supported research prototyping using SLA/FDM printers, laser cutting, milling, turning, and welding equipment.

Selected Projects and Distinctions

- **French Robotics Cup (2025):** contributed to the ARFIT team's autonomous robotics platform.
- **Polytech 3D Challenge (2024) – Winner:** designed and built a compliant prosthetic hand.
- **Interdisciplinary Engineering Project (2023):** developed a waste-detection and urban route-planning system using convolutional neural networks and A* search.
- **French engineering entrance examinations (2023):** shortlisted through the Centrale, Mines-Télécom, CCINP, and E3A competitive examinations as an independent candidate.
- **ENAC airline-pilot selection (2022):** advanced to the PSY2 stage; ranked 50th among approximately 1,200 candidates.

Technical Skills

Software	Python, Julia (SciML), C++, SQL, MATLAB, Scilab
Methods	RL, control systems, numerical simulation, physical modeling, scientific ML
Engineering	CATIA, 3DEXPERIENCE, prototyping, machining
Research	Git, Linux, LaTeX, VS Code, Excel
Languages	French (native), English (C1; TOEIC 965), Italian (B1)

Additional Information

Certifications: French driver's license (B); Ultralight Pilot Theoretical Certificate; Aeronautical Initiation Certificate (BIA).

Interests: sailing, gliding, badminton, cycling, art-house cinema, robotics, aerospace, and naval architecture.