

Myriam **Schönenberger**

Physics-Informed Machine Learning · Robot Learning · PhD Physics, ETH Zürich

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myriam-schoenenberger-cms | Myriam Schönenberger

Research Profile

Physicist turned robot-learning researcher. I work on physics-informed machine learning for robots: building priors such as symmetries, conservation laws and the geometry of dynamics into reinforcement learning and world models, so that agents learn more efficiently and behave robustly on real hardware. For my MSc at KAIST, I developed a method that discovers the symmetries of a robot's dynamics from logged data (CoRL 2026). Before that, I searched for supersymmetry with the CMS experiment at CERN for my PhD at ETH Zürich, and spent two years as a data-privacy consultant for banks.

Experience

KAIST, AI & Probabilistic Reasoning Lab

Seoul, South Korea

Graduate Researcher, Reinforcement Learning & Robotics — advisor: Prof. Kee-Eung Kim — *Feb. 2024 – Aug. 2026*

- Symmetry discovery for robot learning: developed *Transition-Manifold Tangency*, a geometric method that infers joint state–action symmetries of controlled dynamics from logged transitions, without a fitted dynamics model and without assuming a symmetric data distribution (MSc thesis; first-author paper at CoRL 2026, code).
- Designed, implemented and evaluated the approach end to end: denoising-based (score-matching) estimation of data manifolds, search over continuous and discrete symmetry candidates, and symmetry-regularised learned dynamics models for simulated robots.
- Further projects: augmenting a Dreamer-V3 world model's wrist-camera input with generated third-person views (code); physical-property estimation for robot grasping from interaction (project page); sampling-based motion planning (RRT/RRT*, code).

abaQon AG

Zürich, Switzerland

Consultant, Data Privacy — *Jan. 2021 – Apr. 2023*

- Delivered data-privacy compliance projects for three banks, analysing complex database landscapes to identify and classify personal data and assess it for retention or deletion.
- Aligned stakeholders across each bank on legal retention requirements, and built and deployed automated, recurring deletion jobs in production, extending to downstream satellite systems.

ETH Zürich, Institute for Particle Physics and Astrophysics

Zürich & CERN, Geneva

Doctoral Researcher, Experimental Particle Physics — advisor: Prof. Rainer Wallny — *Apr. 2015 – Jun. 2020*

- Designed and carried out searches for supersymmetry in fully hadronic (M_{T2}) and Higgs-to-diphoton final states with the CMS experiment at CERN (doctoral thesis); results published in JHEP and Eur. Phys. J. C.
- Data-driven background estimation and statistical inference on petabyte-scale collision data (Worldwide LHC Computing Grid), within a collaboration of several thousand scientists.
- Detector work: data-quality and performance monitoring; test-beam campaigns for calorimetry at the HL-LHC.
- Teaching assistant: led weekly exercise classes in undergraduate physics.

Education

KAIST, Kim Jaechul Graduate School of AI *Seoul, South Korea*

M.Sc. in Artificial Intelligence *Feb. 2024 – Aug. 2026*

Thesis: *Discovering Control Symmetries via Transition Manifold Tangency*. Began the degree at the University of Zurich (Sep. 2023 – Jan. 2024) before transferring to KAIST.

ETH Zürich *Zürich, Switzerland*

Dr. sc. in Experimental Particle Physics *Apr. 2015 – Mar. 2020*

Thesis: searches for supersymmetry in fully hadronic and Higgs-to-diphoton final states with the CMS detector.

ETH Zürich *Zürich, Switzerland*

B.Sc. and M.Sc. in Physics *Sep. 2009 – Apr. 2015*

Publications

Machine learning & robotics

- **M. Schönenberger** and K.-E. Kim. *Discovering Control Symmetries via Transition Manifold Tangency.* Conference on Robot Learning (CoRL), 2026. [paper] [code]

Particle physics — major contributions to collaboration-wide CMS papers

- CMS Collaboration. *Search for supersymmetry using Higgs boson to diphoton decays at* $\sqrt{s} = 13$ *TeV.* JHEP 11 (2019) 109. [arXiv]
- CMS Collaboration. *Search for new phenomena with the* M_{T2} *variable in the all-hadronic final state produced in proton–proton collisions at* $\sqrt{s} = 13$ *TeV.* Eur. Phys. J. C 77 (2017) 710. [arXiv]
- CMS Collaboration. *Search for new physics with the* M_{T2} *variable in all-jets final states produced in pp collisions at* $\sqrt{s} = 13$ *TeV.* JHEP 10 (2016) 006. [arXiv]

Detector development

- R. Becker et al. *Test beam results with a sampling calorimeter of cerium fluoride scintillating crystals and tungsten absorber plates for calorimetry at the HL-LHC.* Nucl. Instrum. Meth. A 824 (2016) 681. [doi]

Proceedings and thesis

- **M. Schönenberger** (for CMS). *Searches for strong production of supersymmetry in the fully hadronic final states at CMS.* PoS EPS-HEP2017 (2017) 336.
- **M. Schönenberger**. *Searches for supersymmetry in the fully hadronic and Higgs to diphoton final states.* Doctoral thesis, ETH Zürich, 2020. [doi]

Full list: inspirehep.net/authors/1388787

Talks and Poster

- *Discovering Control Symmetries via Transition Manifold Tangency.* Poster, Conference on Robot Learning (CoRL), Austin, 2026.
- *SUSY with CMS.* 8th International Conference on New Frontiers in Physics (ICNFP 2019), Kolymbari, Aug. 2019.
- *Searches for strong production of SUSY in fully-hadronic final states with CMS.* 26th International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2018), Barcelona, Jul. 2018.
- *Searches for strong production of supersymmetry in the fully hadronic final states at CMS.* European Physical Society Conference on High Energy Physics (EPS-HEP 2017), Venice, Jul. 2017.
- *Energy resolution and timing performance studies of a W-CeF_3 sampling calorimeter with a wavelength-shifting fiber readout.* XVII International Conference on Calorimetry in Particle Physics (CALOR 2016), Daegu, May 2016.

Skills

ML & Robotics	PyTorch, JAX, MuJoCo, Gymnasium, Minari
Programming	Python, C++, SQL, Bash; Git, Slurm, grid computing
Languages	English, German, French, Italian, Korean

Outreach & Community

- **CMS Masterclasses, Zürich (2017, 2018):** presenter and exercise supervisor, particle physics for high-school students.
- **CMS guide, CERN:** explained the detector and its physics to visitors of all ages.
- **Improvisational theatre, Geneva (2016 – 2018):** taught free beginner classes at CERN; performed with the troupe *Shark Pockets*.
- **HackZurich 2020:** gamified meal-planning app (devpost).