

Ma, Hao

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ABOUT ME

My research focuses on *embodied intelligence*, with the goal of enabling robots to achieve autonomous learning in the real world. I believe this cannot be achieved through a single approach, but instead calls for a system-level perspective that brings together adaptive control, safety-aware planning, and on-device intelligence. I approach these challenges through model-based online learning, constraint-aware generative planning, and efficient inference of foundation models on edge devices.

EDUCATION

- **ETH Zurich, Switzerland** 04.2022 – 03.2026
Doctorate of Mechanical Engineering
- **Technical University of Munich, Germany** 04.2019 – 11.2021
Master of Automotive Engineering GPA: 1.1/1.0
- **Karlsruhe Institute of Technology, Germany** 10.2018 – 04.2019
Master of Mechatronics and Information Technology
- **Jilin University, China** 09.2013 – 07.2017
Bachelor of Energy and Power Engineering (Automotive Engine) GPA: 3.13/4.0

RESEARCH EXPERIENCE

- **ETH Zurich, Switzerland** 04.2026 – Present
Postdoctoral Researcher
- **Max Planck Institute for Intelligent Systems, Germany** 04.2022 – Present
Scientific Researcher
- **Max Planck Institute for Intelligent Systems, Germany** 05.2021 – 03.2022
Scientific Researcher
 - I did an internship at the Learning and Dynamical Systems Group at the Max Planck Institute for Intelligent Systems under the supervision of Dr. Michael Muehlebach.

PUBLICATIONS

- S. Bodmer, R. Zurbrugg, T. Portela, **H. Ma**, et al. Grounding Generative Policies in Physics: Optimization-Guided Diffusion for Robot Control. *arXiv:2606.24208*, 2026.
- **H. Ma**, M. I. Bal, L. Zhang, et al. SALAAD: Sparse and Low-Rank Adaptation via ADMM for Large Language Model Inference. *International Conference on Machine Learning*, 2026.
- F. Nan, **H. Ma**, Q. Guan, et al. Efficient Model-Based Reinforcement Learning for Robot Control via Online Learning. *International Journal of Robotics Research*, 2025.
- **H. Ma**, S. Bodmer, A. Carron, et al. Constraint-Aware Diffusion Guidance for Robotics: Real-Time Obstacle Avoidance for Autonomous Racing. *Conference on Robot Learning*, 2025.
- S. Guist, J. Schneider, **H. Ma**, et al. Safe & Accurate at Speed with Tendons: A Robot Arm for Exploring Dynamic Motion. *Robotics: Science and Systems*, 2024.
- **H. Ma**, M. Zeilinger, and M. Muehlebach. Stochastic Online Optimization for Cyber-Physical and Robotic Systems. *Machine Learning*, 2024.
- **H. Ma**, D. Büchler, B. Schölkopf, and M. Muehlebach. Reinforcement Learning with Model-Based Feedforward Inputs for Robotic Table Tennis. *Autonomous Robots*, 2023.
- P. Tobuschat, **H. Ma**, D. Büchler, et al. Data-Efficient Online Learning of Ball Placement in Robot Table Tennis. *International Conference on Intelligent Robots and Systems*, 2023.

- J. Achterhold, P. Tobuschat, **H. Ma**, et al. Black-Box vs. Grey-Box: A Case Study on Learning Table Tennis Ball Trajectory Prediction with Spin and Impacts. *Learning for Dynamics and Control Conference*, 2023.
- S. Guist, J. Schneider, **H. Ma**, et al. A Robust Open-Source Tendon-Driven Robot Arm for Learning Control of Dynamic Motions. *RoboLetics: Workshop on Robot Learning in Athletics*, 2023.
- **H. Ma**, D. Büchler, B. Schölkopf, and M. Muehlebach. A Learning-Based Iterative Control Framework for Controlling a Robot Arm with Pneumatic Artificial Muscles. *Robotics: Science and Systems*, 2022.

TEACHING EXPERIENCE

- **Ashesi University** 02.2026 (block course)
Lecturer Ghana
– I participated in the ETH–Ashesi MSc/MAS Mechatronics program at Ashesi University in Ghana, where I taught the course “Signals and Systems” and was primarily responsible for delivering the lectures.
- **Eidgenössische Technische Hochschule Zürich** 06.2024 (block course) and 02.2023 – 06.2023
Teaching Assistant Switzerland
– I served twice as a teaching assistant for Dr. Michael Muehlebach at Eidgenössische Technische Hochschule Zürich for the course “Large-Scale Convex Optimization”. I was mainly responsible for the colloquia and designing exercises and exams.

ACADEMIC SERVICE

- **On-Device Intelligence: Foundation Models under Real-World Constraints** 12.2026
Workshop Organizer, *NeurIPS 2026* Sydney, Australia

AWARDS

- **Max-ETH Center for Learning Systems Fellowship** 05.2022 – 05.2024
highly competitive fellowship funding Ph.D. studies (acceptance rate 3% – 4%)
- **Deutschlandstipendium** 10.2020 – 09.2021
awarded by the Bundesministerium für Bildung und Forschung
- **Third-class Scholarship** 09.2015 – 07.2016
awarded by Jilin University
- **Third-class Scholarship** 09.2014 – 07.2015
awarded by Jilin University
- **Second-class Scholarship** 09.2013 – 07.2014
awarded by Jilin University

PUBLIC COMMUNICATION

- **Talk at the EWRL 2025** 2025
European Workshop on Reinforcement Learning
– I presented a contributed talk at the EWRL 2025, entitled *Provably Efficient Online Learning in Real-World Cyber-Physical and Robotic Systems*.
- **Wissen Was mit Doktor Watson** 2024
YouTube video with science communicator Cedric Engels
– I supported the live demonstration of a ping-pong playing robot during my supervisor’s media interview.
- **Max Planck Research Magazine** 2023
Special issue on “Orientation”
– I supported the live demonstration and explanation of a ping-pong playing robot featured in my supervisor’s magazine interview.
- **Science and Innovation Days Tübingen** 2023
Live robotics presentation to the general public in Tübingen
– I delivered a live presentation on the working principles of a ping-pong playing robot, showcasing its functionality and enabling hands-on interaction for the public.

TECHNICAL SKILLS

Programming Languages: MATLAB/Simulink, Python
Frameworks & Libraries: ROS, PyTorch, TensorFlow, MuJoCo, Isaac Gym, Brax, Hugging Face
Tools & Platforms: Git, Docker, VSCode, Jupyter, HPC Clusters; **OS:** Windows, Linux
Document Tools: MS Office, LaTeX, TikZ; **Languages:** Chinese (Native), English (C1), German (DSH-2)