Yunfan Gao

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Education

Mar 2022–Present
PhD in Microsystems Engineering — Freiburg, Germany
Albert-Ludwigs-Universität Freiburg
- *Advisor*: Prof. Dr. Moritz Diehl
- *Thesis*: Robust optimal control of fast robots in confined spaces.
- Associated fellow of Marie Skłodowska-Curie Innovative Training Network ELO-X.

Sep 2019–Jan 2022
Master in Robotics, Systems, and Control — Zürich, Switzerland
ETH Zürich — *GPA: 5.82/6.00*
- *Thesis project*: Projection-based augmented reality with an ANYmal robot, supervised by Dr. Ryan Luke Johns, Perry Franklin, and Prof. Dr. Marco Hutter.
- *Semester project*: Multi-sensor fusion for drone localization, supervised by Dr. David Hug, Dr. Marco Karrer, and Prof. Dr. Margarita Chli.
- *Award*: Degree awarded "with distinction", Swiss Robotics Master Award

Sep 2015–Jun 2019
Bachelor in Electronic Engineering — Shanghai, China
Fudan University — *GPA: 3.79/4.00*
- *Thesis project*: Channel-state-information-based indoor smartphone localization, supervised by Prof. Dr. Yuedong Xu.

Sep 2017–Dec 2017
Exchange Program — Santa Barbara, the United States
University of California, Santa Barbara — *GPA: 4.00/4.00*

Professional Experience

Mar 2022–Sep 2025
Industrial PhD student in Robotics — Renningen, Germany
Bosch Corporate Research
- *Supervisor*: Dr. Niels van Duijkeren
- Research and development of real-time-feasible optimal control of mobile robots: (i) enabling smooth navigation in confined space where robots can barely navigate through; (ii) robustifying collision avoidance in the presence of uncertainties caused by model-plant mismatch and other moving objects.
- Demonstration of the proposed controllers in real-world robotic experiments.
- Extension of the collision-free optimal control methods to manipulation tasks.

Jul 2021–Dec 2021
Software Development Intern — Oberkochen, Germany
Carl Zeiss
- Sensor fusion (combining camera and IMU data) for object tracking.

Selected Publications

One manuscript (as first author) has been submitted to *IEEE Transactions on Robotics*. [pdf]

2024
- **Y. Gao**, F. Messerer, N. van Duijkeren, B. Houska, M. Diehl. "Real-Time-Feasible Collision-Free Motion Planning For Ellipsoidal Objects," in *Proc. of the IEEE Conf. on Decision and Control (CDC)*, Dec 2024. [pdf]
- **Y. Gao**, F. Messerer, N. van Duijkeren, and M. Diehl, "Stochastic Model Predictive Control with Optimal Linear Feedback for Mobile Robots in Dynamic Environments," *IFAC-PapersOnLine*, Aug 2024. [pdf]

2024

- J. Frey, **Y. Gao**, F. Messerer, A. Lahr, M. Zeilinger, and M. Diehl "Efficient Zero-Order Robust Optimization for Real-Time Model Predictive Control with acados," in *Proc. of the European Control Conf. (ECC)*, Jun 2024. [pdf]

2023

- **Y. Gao**, F. Messerer, J. Frey, N. van Duijkeren, and M. Diehl, "Collision-free motion planning for mobile robots by zero-order robust optimization-based MPC," in *Proc. of the European Control Conf. (ECC)*, Jun 2023. [pdf]

2020

- Z. Gao*, **Y. Gao***, S. Wang, D. Li, and Y. Xu, "CRISLoc: Reconstructable CSI Fingerprinting for Indoor Smartphone Localization," *IEEE Internet of Things Journal*, Sep 2020. [pdf]

Teaching Experience

Oct 2022–Jun 2023 — **Supervision of Master Thesis** — Renningen, Germany
Bosch Corporate Research
- *Thesis Project*: Optimization-based motion planning using signed-distance maps.

May 2021–Oct 2021 — **Supervision of Master Thesis** — Renningen, Germany
Bosch Corporate Research
- *Thesis Project*: Safety certification of motion control for mobile robots.

2011 — **Teaching Assistant** — Zurich, Switzerland
ETH Zürich
- Taught tutorial and exercise sessions for the course *Programming for Robotics—ROS*.

Professional Service

Mar 2025–Apr 2025 — Co-organized the Hackathon at the workshop *Future PhD in control*, supported by IEEE CSS and EUCA.

Apr 2023–Oct 2023 — Co-organized the Bosch PhD Conference, attended by over 150 participants.

Skills

Programming: Python, C++
Competency: Model predictive control, numerical optimal control, robotics
Software: ROS 2, Git, MuJoCo
Language: English (fluent), Chinese (native), German (basic)

References

Prof. Moritz Diehl	Professor, Universität Freiburg	moritz.diehl@imtek.uni-freiburg.de
Dr. Niels van Duijkeren	Staff Engineer, Fernride GmbH (now) Senior Expert, Bosch Research (prev.)	niels.duijkeren@fernride.com
Prof. Boris Houska	Associate Professor, ShanghaiTech University	borish@shanghaitech.edu.cn
Dr. Ralph Lange	R&D manager in robotics, Trumpf (now) Robotics Portfolio Lead, Bosch Research (prev.)	ralph.lange@trumpf.com