Yunfan Gao

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Google scholar: https://scholar.google.com/citations?&user=iR36jUoAAAAJ

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.
- Funded by Bosch Research until Sep 2025; internal PhD student from Oct 2025.
- 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 plant-model 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.

Publications

2025
- F. Messerer, **Y. Gao**, J. Frey, M. Diehl. "Riccati-ZORO: An efficient algorithm for heuristic online optimization of internal feedback laws in robust and stochastic model predictive control," *arXiv preprint*, 2025. [pdf][code]
- **Y. Gao**, F. Messerer, N. van Duijkeren, R. Dabir, M. Diehl. "Semi-Infinite Programming for Collision-Avoidance in Optimal and Model Predictive Control," *arXiv preprint*, 2025. [pdf][code]

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] [code]
- **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]
- 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][code]

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]
- **Y. Gao**, F. Messerer, N. van Duijkeren, and M. Diehl, "Optimization-based collision checking between objects represented by Minkowski sums of ellipsoids," filed at German patent office, 2023.

2021

- Z. Gao, A. Li, **Y. Gao**, B. Li, Y. Wang, Y. Chen, "FedSwap: A Federated Learning based 5G Decentralized Dynamic Spectrum Access System," in *IEEE/ACM Int. Conf. on Computer Aided Design (ICCAD)*, Nov 2021. [pdf]
- Z. Gao, A. Li, **Y. Gao**, Y. Wang, and Y. Chen, "Hermes: Decentralized Dynamic Spectrum Access System for Massive Devices Deployment in 5G," in *Proc. of the Int. Conf. on Embedded Wireless Systems and Networks*, Apr 2021. [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] (* These authors contributed equally.)

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.