

Yunfan Gao

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EDUCATION

Mar 2022–Present	PhD in Microsystems Engineering Albert-Ludwigs-Universität Freiburg <ul style="list-style-type: none">• <i>Advisor</i>: Prof. Dr. Moritz Diehl• <i>Thesis</i>: 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.	Freiburg, Germany
Sep 2019–Jan 2022	Master in Robotics, Systems, and Control ETH Zürich <ul style="list-style-type: none">• <i>Thesis project</i>: Projection-based augmented reality with an ANYmal robot, supervised by Dr. Ryan Luke Johns, Perry Franklin, and Prof. Dr. Marco Hutter.• <i>Semester project</i>: Multi-sensor fusion for drone localization, supervised by Dr. David Hug, Dr. Marco Karrer, and Prof. Dr. Margarita Chli.• <i>Award</i>: Degree awarded “with distinction”, Swiss Robotics Master Award	Zürich, Switzerland <i>GPA: 5.82/6.00</i>
Sep 2015–Jun 2019	Bachelor in Electronic Engineering Fudan University <ul style="list-style-type: none">• <i>Thesis project</i>: Channel-state-information-based indoor smartphone localization, supervised by Prof. Dr. Yuedong Xu.	Shanghai, China <i>GPA: 3.79/4.00</i>
Sep 2017–Dec 2017	Exchange Program University of California, Santa Barbara	Santa Barbara, the United States <i>GPA: 4.00/4.00</i>

PROFESSIONAL EXPERIENCE

Mar 2022–Sep 2025	Industrial PhD student in Robotics Bosch Corporate Research <ul style="list-style-type: none">• <i>Supervisor</i>: 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.	Renningen, Germany
Jul 2021–Dec 2021	Software Development Intern Carl Zeiss <ul style="list-style-type: none">• Sensor fusion (combining camera and IMU data) for object tracking.	Oberkochen, Germany

PUBLICATIONS

2026	<ul style="list-style-type: none">• Y. Gao, F. Messerer, N. van Duijkeren, R. Dabir, M. Diehl. “Semi-Infinite Programming for Collision-Avoidance in Optimal and Model Predictive Control,” <i>IEEE Transactions on Robotics</i>, to appear, 2026. [pdf][code]
2025	<ul style="list-style-type: none">• 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,” <i>arXiv preprint</i>, 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.