

Jon Arrizabalaga

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EDUCATION

- **Technical University of Munich** Munich, Germany
PhD - Robotics & Control; Committee: Prof. Markus Ryll, Prof. Zachary Manchester, Prof. Moritz Diehl November 2020 - October 2025
- **KTH Royal Institute of Technology** Stockholm, Sweden
Master of Science - Mechatronics September 2018 - July 2020
- **University of Navarre** San Sebastian, Spain
Bachelor of Science - Mechanical Engineering September 2014 - July 2018

ACADEMIC EXPERIENCE

- **Carnegie Mellon University** Pittsburgh, USA
Visitor / Postdoc - Robotics Institute (RI); Advisor: Prof. Zachary Manchester January 2024 - Present
- **Charles University** Prague, Czech Republic
Visiting PhD - Mathematics Institute; Advisor: Prof. Zbyněk Šíř May 2023
- **Shanghai Jiao Tong University** Shanghai, China
Visiting student - Mechanical Engineering September 2017 - January 2018

INDUSTRY EXPERIENCE

- **Bosch Research** Renningen, Germany
MSc Thesis - Robotics Researcher; Advisors: Dr. Niels van Duijkeren, Dr. Ralph Lange January 2020 - July 2020
- **Porsche AG** Weissach, Germany
Intern - Test Field; Advisor: Eric Preisig May 2019 - September 2019

TEACHING

- **Engineering Mechanics I** Technical University of Munich
Lecturer; Programme: BSc Aerospace, Enrolled students: 200 (21-22), 350 (22-23) and 450 (23-24) Winter Semesters 21-22, 22-23 and 23-24
- **Mechanics for Aerospace** Technical University of Munich - Asia (Singapore)
Lecturer; Programme: MSc Aerospace, Enrolled students: 20 (23-24) and 25 (24-25) Winter Semesters 23-24 and 24-25
- **Introduction to ROS (Robot Operating System)** Technical University of Munich
Lecturer; Programme: MSc Robotics / Mechanical / Aerospace, Enrolled students: 50 Summer Semesters 21-22 and 22-23
- **Dynamics Motion and Control** KTH Royal Institute of Technology
Teaching Assistant; Programme: MSc Robotics / Mechanical / Mechatronics, Enrolled students: 50 Winter Semester 19-20
- **Robust Mechatronics** KTH Royal Institute of Technology
Teaching Assistant; Programme: MSc Robotics / Mechanical / Mechatronics, Enrolled students: 50 Winter Semester 19-20

HONORS & AWARDS

- **Best Robocup Paper Award (finalist)** IROS 2024
Honors the best paper related to RoboCup research presented at IEEE/RSJ International Conference on Intelligent Robots and Systems. Out of approximately 4000 submissions, 5 papers are nominated. Abu Dhabi, UAE
- **Best PhD Lecturer Award** Technical University of Munich
Recognizes the PhD lecturer who has received the highest evaluations from BSc and MSc students within the Aerospace and Geodesy faculty Winter Semester 21-22
- **Outstanding End-of-Degree Award (finalist)** University of Navarre
Honors BSc. students who have excelled in both their academic and extracurricular endeavors Years 14-18

INVITED TALKS

- **Northeast Systems and Control Workshop** Columbia University
Talk title: Egocentric Decision-Making for Robot Autonomy May 25
- **Talking Robotics** Online Seminar
Hosts: N. Kalavakonda, R. Laha; Talk title: Egocentric Decision-Making for Robot Autonomy – Recording April 25
- **Vijay Kumar Lab - GRASP Laboratory** University of Pennsylvania
Prof. Vijay Kumar; Talk title: A Universal Formulation for Path-Parametric Planning & Control May 24
- **Robotics and Perception Group** University of Zurich
Prof. Davide Scaramuzza; Talk title: Towards Time-Optimal Tunnel-Following for Quadrotors April 22
- **Institute of Flight Systems** German Aerospace Center, DLR
Prof. Stefan Levedag; ; Talk title: Path-Parametric Planning and Control for Autonomous Aerial Vehicles January 23

PUBLICATIONS

- *Egocentric Decision-Making for Robot Autonomy*; J. Arrizabalaga; PhD Thesis, 2025 — Thesis, Talk
- *DQ-NMPC: Dual-Quaternion NMPC for Quadrotor Flight*; L. F. Recalde, D. Agrawal, J. Arrizabalaga*, G. Li; Robotics and Automation Letters (RA-L), 2025 — Paper, Video, Code, Website
- *Convex Maneuver Planning for Spacecraft Collision Avoidance*; F. Vega, J. Arrizabalaga*, R. Watson, Z. Manchester; IEEE International Conference on Space Robotics (iSpaRo), Sendai, Japan, 2025 — Paper, Code
- *The Trajectory Bundle Method: Unifying Sequential-Convex Programming and Sampling-Based Trajectory Optimization*; K. Tracy, J. Zhang, J. Arrizabalaga*, S. Shaal, Y. Tassa, T. Erez, Z. Manchester; Under review, 2025 — Paper
- *Conflict-Based Search as a Protocol: A Multi-Agent Motion Planning Protocol for Heterogeneous Agents, Solvers, and Independent Tasks*; R. Veerapaneni, A. Tang, H. He, S. Zhao, V. Shah, Y. Cen, Z. Ji, G. Olin, J. Arrizabalaga*, Y. Shaoul, M. Likhachev; Under review, 2025 — Paper, Website
- *Trajectory Planning Using Safe Ellipsoidal Corridors as Projections of Orthogonal Trust Regions*; A. Jaitly, J. Arrizabalaga*, G. Li; Under review, 2025 — Paper, Video
- *A Universal Formulation for Path-Parametric Planning and Control*; J. Arrizabalaga*, Z. Sir, Z. Manchester, M. Ryll; Under review, 2025 — Paper, Website, Code, Talk
- *Differentiable Collision-Free Parametric Corridors*; J. Arrizabalaga*, Z. Manchester, M. Ryll; IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi, UAE, 2024 — Paper, Code, Video, Talk — **Best Paper Finalist**
- *PHODCOS: Pythagorean Hodograph-based Differentiable Coordinate System*; J. Arrizabalaga*, F. Vega, Z. Sir, Z. Manchester, M. Ryll; IEEE Aerospace Conference, Big Sky, Montana, USA, 2025 — Paper, Code, Talk
- *Geometric Sloss-Free Tracking for Robotic Manipulators*; J. Arrizabalaga*, L. Pries, R. Laha, R. Li, S. Haddadin, M. Ryll; IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, 2024 — Paper, Code, Video, Talk
- *Learning for CasADi: Data-Driven Models in Numerical Optimization*; T. Salzmann, J. Arrizabalaga*, J. Andersson, M. Pavone, M. Ryll; Learning for Dynamics and Control Conference (L4DC), 2024 — Paper, Code, Talk
- *Pose-Following with Dual Quaternions*; J. Arrizabalaga*, M. Ryll; IEEE Conference on Decision and Control (CDC), Singapore, 2023 — Paper, Code, Talk
- *SCTOMP: Spatially Constrained Time-Optimal Motion Planning*; J. Arrizabalaga*, M. Ryll; IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, USA, 2023 — Paper, Video
- *Spatial Motion Planning with Pythagorean Hodograph curves*; J. Arrizabalaga*, M. Ryll; IEEE Conference on Decision and Control (CDC), Cancun, Mexico, 2022 — Paper, Video, Talk
- *Towards Time-Optimal Tunnel-Following for Quadrotors*; J. Arrizabalaga*, M. Ryll; IEEE International Conference on Robotics and Automation (ICRA), Philadelphia, USA, 2022 — Paper, Video
- *Neural-MPC: Deep learning model predictive control for quadrotors and agile robotic platforms*; T. Salzmann, E. Kaufmann, J. Arrizabalaga*, M. Pavone, D. Scaramuzza, M. Ryll; Robotics and Automation Letters (RA-L), 2022 — Paper, Code
- *A caster-wheel-aware MPC-based motion planner for mobile robotics*; J. Arrizabalaga*, N. van Duijkeren, M. Ryll, R. Lange; IEEE International Conference on Advanced Robotics (ICAR), Ljubljana, Slovenia, 2021 — Paper, Video, Thesis

STUDENTS MENTORED

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|--|---|
| • Viraj Shah, Eden Cen | <i>now at</i>
Carnegie Mellon University |
| <i>Research Project:</i> Conflict-Based Search as a Protocol | |
| • Akshay Jaitly | Worcester Polytechnic Institute |
| <i>Research Project:</i> Trajectory Planning Using Safe Ellipsoidal Corridors | |
| • Luis F. Recalde | Worcester Polytechnic Institute |
| <i>Research Project:</i> Dual-Quaternions for Rigid Body Predictive Control | |
| • Giuseppe Soldati | Technical University of Munich |
| <i>Semester Thesis:</i> Development of an Optimal Control-Based Tracker for the Rocket Hopper | |
| • Harun Tongay Tamtürk | Airbus Defence and Space |
| <i>Semester Thesis:</i> Flight Corridor Planning for Navigation of UAVs within Dynamics Environments | |
| <i>MSc. Thesis:</i> Vision-Based Localization of High-Altitude UAVs | |

- **Bruno Sorban** Rocket Factory Augsburg
Semester Thesis: Optimal Trajectory Control of a Hopper Rocket, Code
- **Tommaso Faraci** German Aerospace Center (DLR)
Research Project: Economic MPC for Path-Parametric Control

EXTRACURRICULAR PROJECTS

- **ASCENT - Rocket Hopper** Technical University of Munich
Guidance and Control Lead; Website 2022-2024
- **The Juggling Robot Project** KTH Royal Institute of Technology
Team Lead, Software and Control Engineer; Video (year 21-22) Winter Semester 19-20
- **Formula Student** University of Navarre
Vehicle Dynamics Engineer; Team: Tecnum eRacing Seasons 16-17 and 17-18

REVIEW ACTIVITIES

- IEEE Robotics and Automation Letters (RA-L)
- IEEE Control Systems Letters (L-CSS)
- IEEE Transactions on Systems, Man, and Cybernetics: Systems (TSMC)
- Robotics Science and Systems (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE Conference on Decision and Control (CDC)
- IEEE International Conference on Humanoid Robots (Humanoids)
- IEEE International Conference on Space Robotics (iSpaRo)