Jon Arrizabalaga

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Education

- **Technical University of Munich** — Munich, Germany
  PhD - Robotics & Control; ***Advisors:*** *Prof. Markus Ryll, Prof. Zachary Manchester* — *November 2020 - Present*
- **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
  Visiting PhD - Robotics Institute (RI); ***Advisor:*** *Prof. Zachary Manchester* — *January 2024 - Present*
- **Charles University** — Prague, Czech Republic
  Visiting PhD - Mathematics Institute; ***Advisor:*** *Prof. Zbyněk ŠÍR* — *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 Preising* — *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

- **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

- *A Universal Formulation for Path-Parametric Planning and Control*; J. Arrizabalaga*, Z. Sir, Z. Manchester, M. Ryll; Under review, 2025 — Paper,Website, Code,
- *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 Slosh-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

- **Luis F. Recalde** — *now at* Worcester Polytechnic Institute
  Research Project: Dual-Quaternions for Rigid Body Predictive Control
- **Giuseppe Soldati** — Technical University of Munich
  Semester Thesis: Development of an Optimal Control-Based Tracker for the Rocket Hopper
- **Harun Tongay Tamtürk** — Airbus Defence and Space
  Semester Thesis: Flight Corridor Planning for Navigation of UAVs within Dynamics Environments
  MSc. Thesis: 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, *2022-2024*
  Guidance and Control Lead; Website
- **The Juggling Robot Project** — KTH Royal Institute of Technology, *Winter Semester 19-20*
  Team Lead, Software and Control Engineer; Video (year 21-22)
- **Formula Student** — University of Navarre, *Seasons 16-17 and 17-18*
  Vehicle Dynamics Engineer; ***Team:*** *Tecnun eRacing*

Review Activities

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