

Joaquim Ortiz-Haro

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Huttenstrasse 5, 10553 Berlin (Germany) \diamond Citizenship: Spanish

PhD student in robotics at TU Berlin (Germany). My research interests are in task and motion planning, nonlinear optimization and deep learning for robotics.

EDUCATION

PhD in Robotics 2019 - Expected 2023
TU Berlin (Germany) and IMPRS-IS (Max Planck Research School). Task and motion planning, nonlinear optimization and deep learning for robotics. Advisor: Marc Toussaint.

Master of Mathematics 2017 - 2019
UPC (Polytechnic University Catalonia, Barcelona), faculty FME. Average qualification: 9.38/10. Exchange student in LAAS-CNRS (French National Research Center).

Bachelor of Mechanical Engineering 2013 - 2017
UPC (Polytechnic University Catalonia, Barcelona), faculty ETSEIB. Top Class Honours. Ranked 2nd of 350 graduate students. Average qualification 8.84/10. Exchange student in ETH, Zurich (Switzerland).

High School 2014 - 2017
Honour Mention in Spanish University Entrance Exam (13.36/14). Scholarship to study first year in university. Gold Medal in XXVI Chemistry Spanish National Olympic.

PUBLICATIONS

1. J. Ortiz-Haro, J.-S. Ha, D. Driess, E. Karpas, and M. Toussaint. Learning feasibility of factored nonlinear programs in robotic manipulation planning. In *Proc. of the IEEE Int. Conf. on Robotics and Automation (ICRA)*, 2023
2. J. Ortiz-Haro, E. Karpas, M. Katz, and M. Toussaint. Conflict-driven interface between symbolic planning and nonlinear constraint solving. In *IEEE Robotics and Automation Letters (RA-L)*, 2022
3. Wolfgang Hönig, Joaquim Ortiz-Haro, and Marc Toussaint. db-a*: Discontinuity-bounded search for kinodynamic mobile robot motion planning. In *Proc. of the IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, 2022
4. Cornelius V. Braun, Joaquim Ortiz-Haro, Marc Toussaint, and Ozgur S. Oguz. Rhh-lgp: Receding horizon and heuristics-based logic-geometric programming for task and motion planning. In *Proc. of the IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, 2022
5. Jay Kamat, Joaquim Ortiz-Haro, Marc Toussaint, Florian T. Pokorný, and Andreas Orthey. Bitkomo: Combining sampling and optimization for fast convergence in optimal motion planning. In *Proc. of the IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, 2022
6. Joaquim Ortiz-Haro, Erez Karpas, Michael Katz, and Marc Toussaint. Conflict-directed diverse planning for logic-geometric programming. In *International Conference on Automated Planning and Scheduling (ICAPS)*, 2022
7. Joaquim Ortiz-Haro, Jung-Su Ha, Danny Driess, and Marc Toussaint. Structured deep generative models for sampling on constraint manifolds in sequential manipulation. In *5th Annual Conference on Robot Learning (CoRL)*, 2021

8. Joaquim Ortiz-Haro, Valentin N. Hartmann, Ozgur S. Oguz, and Marc Toussaint. Learning efficient constraint graph sampling for robotic sequential manipulation. In *Proc. of the IEEE Int. Conf. on Robotics and Automation (ICRA)*, 2021

EXPERIENCE

Research Internship Machine Learning 2019

Optimal transport and theoretical machine learning. Artificial Intelligence and Machine Learning Group at UPF (University Pompeu Fabra, Barcelona). Supervisor: Gergely Neu.

Research Internship Robotics 2018

Contact and trajectory optimization with an augmented Lagrangian algorithm. Humanoid Robotics in LAAS-CNRS (French National Research Center). Supervisor: Nicolas Mansard.

Internship Robotics Engineer 2018

Geometric and semantic analysis of 3D Point Clouds. Scaled Robotics (start-up, Barcelona).

Seat Autonomous Car competition 2017

Team of IRI (Robotics Institute, Barcelona) for an autonomous driving competition, scale 1:10.

Research Assistant SLAM 2017

Parallel Tracking and Mapping Algorithms for an Event Based Camera. IRI (Robotics Institute, Barcelona). Supervisor: Joan Solà.

Teacher Assistant 2015 - 2017

Mathematics for first year engineering students in ETSEIB, UPC.

Private Academy teacher 2014

Private Academy teacher. University-level engineering lessons.

PROGRAMMING

C++ Main tool for robotics research in the PhD. Internship in robotics company and robotics competitions. BOOST, ROS, PCL, OPENCV, EIGEN, OMPL, ...

Python Deep Learning research in the PhD (PYTORCH). Master thesis in robotics and numerical optimization (SCIPY, NUMPY, ...) and programming courses.

Matlab Bachelor Thesis (robotics and computer vision), university courses.

Other Arduino, ANSYS, Solid Works, Minitab, Autodesk Fusion.

LANGUAGES

Spanish and Catalan native.

English Professional Knowledge. Scientific publications, Bachelor and Master thesis written in English. Advanced Certificate (CAE) from Cambridge University, C1.2 (2013).

French Official certificate DELF B2 (2019). 6-month exchange in Toulouse.

German Official certificate B2.2 from Goethe Institute (2017). Engineering courses held in German in ETH. Two language summer courses in Germany.

PERSONAL SKILLS

Passionate about research, problem solving and learning. Experience in interdisciplinary and international teams. Compromise, honesty and hardwork. I love teaching and transmitting my knowledge. In my free time, I like to go climbing and cycling and read books. I also play the guitar and I am learning piano.

STUDENT SUPERVISION

1. Efficient Kynodynamic Motion Planning with Reinforcement Learning Policies. Alexander Weingart. Co-supervision with Wolfgang Hoenig. Master Thesis Computer Science (TU Berlin).
2. Neural Scene Representations for Sequential Reasoning. Phillip Groete. Co-supervision with Ozgur Oguz. Master Thesis Computer Science (TU Berlin).
3. SCP and k-Order Motion Optimization for Cooperative Multirotor Teams. Welf Rehberg. Co-supervision with Wolfgang Hoenig. Master Thesis Computer Science (TU Berlin).
4. Combining Sampling and Optimization for Optimal Motion Planning. Jay Kamat. Co-supervision with Andreas Orthey. Master Thesis Mathematics (BITS and TU Berlin).
5. Constrained Sampling - A Study on Methods for Sampling from Constraint Manifolds. Philip Oedi. Co-supervision with Jung-Su Ha. Master Thesis Computer Science (TU Berlin).

TEACHING

1. AI & Robotics: Lab Course. M.Sc. Computer Science TU-Berlin. Teacher Assitant. Summer Semester 2022.
2. Optimization Algorithms. M.Sc. Computer Science TU-Berlin. Teacher Assistant. Winter Semester 2020, 2021 and 2022.
3. Calculus II. B.Sc. Industrial (mechanical) Engineering. UPC Barcelona (ETSEIB). Teacher in Aula LLiure. Summer Semester 2015, 2016 and 2017.
4. Calculus I. B.Sc. Industrial (mechanical) Engineering. UPC Barcelona (ETSEIB). Teacher in Aula LLiure. Winter Semester 2015.

INVITED TALKS

2022 - A Bidirectional Interface between Nonlinear Optimization and Symbolic Planning for Task and Motion Planning. Robotics Seminar Technion (Israel). Host: Erez Karpas.

2021 - Structured deep generative models for sampling on constraint manifolds in sequential manipulation. Seminar of group Gepetto. LAAS-CNRS (France). Host: Nicolas Mansard.

SERVICE

Reviewer: ICRA, IROS, RAL, CoRL, JAIR.