



● EDUCATION AND TRAINING

01/11/2023 – CURRENT Renningen, Germany

DOCTORAL STUDENT University of Genova / Robert Bosch Research GmbH

Doctoral Programme / PhD Student

Research topic: "Development of Methods and Tools for the Scalable Validation of Robotics Deliberation."

Officially enrolled as a doctoral student at the University of Genova since November 2023, with doctoral research carried out in collaboration with Robert Bosch Research GmbH.

01/10/2019 – 22/07/2021 Genova, Italy

MASTER'S DEGREE IN ROBOTICS AND MECHATRONICS (110/110) University of Genova

Master's programme fully taught and assessed in English, within the University of Genoa Robotics Engineering local track associated with the EMARO advanced robotics framework. Main subjects included software architectures for robotics, ROS and advanced robot programming, real-time operating systems, embedded systems, computer vision, machine learning for robotics, modelling and control of robotic systems, mechanical design methods, mobile robots, nonlinear control, system identification, and experimental robotics.

Thesis: "Hybrid Traversability Scoring Architecture for Legged Robots Based on Mesh Simplification of the Environment," mainly carried out at BioRob Laboratory, EPFL, Lausanne. Developed a ROS-based traversability module, validated it in Gazebo and on the Unitree A1 quadruped robot, and configured the experimental setup integrating the robot with an OptiTrack motion capture system.

01/09/2016 – 24/09/2019 Pavia, Italy

BACHELOR'S DEGREE IN INDUSTRIAL ENGINEERING – MECHANICAL CURRICULUM (109/110) University of Pavia

Industrial engineering fundamentals with a mechanical focus: mathematics, physics, computer science/programming, electrotechnics, applied mechanics, technical physics, industrial measurements, automatic control, structural mechanics, machine design, mechanical technology, and industrial plant design, operation and maintenance. Developed skills in modelling, analysis, technical problem-solving, and design of mechanical and industrial systems.

Thesis: "Progettazione, Costruzione e Controllo di un Robot da laboratorio"

● WORK EXPERIENCE

DOCTORAL STUDENT – ROBERT BOSCH RESEARCH GMBH – 01/04/2023 – Current – RENNINGEN, GERMANY

Research activities at the intersection of formal verification, machine learning, optimization, and autonomous robotic decision-making. The work covers formal methods, model checking and statistical model checking; Bayesian optimization, genetic algorithms and quality-diversity optimization; and deliberative architectures for robotics based on Markov decision processes, behavior trees and Petri nets. This research has led to first-author publications at GECCO 2025 and MODELS 2025, in the areas of evolutionary computation and model-driven engineering.

Research Topic: Development of Methods and Tools for the Scalable Validation of Robotics Deliberation

RESEARCH AND DEVELOPMENT ENGINEER – ABB ELECTRIFICATION – 01/02/2022 – 01/03/2023 – DALMINE, ITALY

Worked on R&D activities in ABB Electrification, focusing on digital solutions for monitoring and diagnostics of smart switchgear systems. Contributed to the revamping of a smart demonstrator and developed software components using C++ and Python, including communication protocols based on Modbus TCP/IP and RTU.

Contributed to robotics and UAV-related R&D activities for monitoring power lines and energy generation sites. Developed localization filtering components using ROS, C++, and Python in the context of autonomous unmanned technologies.

SKILLS

Robotics

motion capture | robotics | algorithms | control systems | embedded systems | ROS (Robot Operating System)

Tools

Linux | Git | LaTeX

Programming

C | MATLAB | C++ | Python

LANGUAGE SKILLS

Mother tongue(s): ITALIAN

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

PUBLICATIONS

2025
Translating Behavior Trees to Petri Nets for Model Checking

First-author research paper proposing a translation from Behavior Trees to Petri Nets to support model checking of robotic decision-making systems. The work contributes to formal verification of robotic deliberation architectures by enabling Behavior Tree-based models to be analysed within a Petri Net-based verification framework.

“Translating Behavior Trees to Petri Nets for Model Checking,” in 2025 ACM/IEEE 28th International Conference on Model Driven Engineering Languages and Systems, MODELS 2025, Grand Rapids, MI, USA, 2025, pp. 154–163. IEEE, 2025.

Authors: Matteo Palmas; Michaela Klauck; Ralph Lange; Enrico Ghiorzi; Armando Tacchella | Journal Name: ACM/IEEE 28th International Conference on Model Driven Engineering Languages and Systems | Volume, Issue and Pages: pp. 154–163 | Publisher: IEEE

2025
Efficient Quality Diversity Optimization with Monte Carlo Bayesian Sampling

First-author conference paper presenting an efficient Quality-Diversity optimization method based on Monte Carlo Bayesian sampling. The work combines Monte Carlo simulation with Bayesian optimization techniques to improve the efficiency of Quality-Diversity search, particularly in settings involving expensive evaluations.

“Efficient Quality Diversity Optimization with Monte Carlo Bayesian Sampling,” in Proceedings of the Genetic and Evolutionary Computation Conference Companion, GECCO ’25 Companion, Málaga, Spain, 2025, pp. 503–506. ACM, 2025.

Authors: Matteo Palmas; Varun Bhatt; Shihan Zhao; Stefanos Nikolaidis; Ralph Lange; Michaela Klauck | Journal Name: Proceedings of the Genetic and Evolutionary Computation Conference Companion, GECCO ’25 Companion | Volume, Issue and Pages: pp. 503–506 | Publisher: ACM