Davide Carminati, Ph.D.

Work Experience

03/2026 – present
Computer Vision and Robotics Engineer – TTControl s.r.l. (Bressanone, IT)
Emerging Technologies Group
- Helping partners and costumers by providing tailored software solutions based on innovative technologies for *Off-Highway* applications.

11/2024 – 03/2026
Industrial Researcher (R&D) – MAVTech s.r.l. (Bolzano, IT)
- Designing and implementing SLAM, networking architectures, and AI algorithms to enhance UAV capabilities, enabling safer autonomous navigation, precise 3D mapping and real-time data processing for agricultural monitoring, Search&Rescue and bridge inspection.

02/2023 – 08/2024
Research Fellow – Politecnico di Torino (IT)
STREAM robotics group – Department of Mechanical and Aerospace Engineering.
- Maintained the robotic platforms in the laboratory for Ph.D. and Master's students.
- Implemented Bayesian algorithms (SMC/Particle Filter, Parallel Tempering) in CUDA for a faster parallel execution.
- Research focused on Bayesian methods for data efficient state-space modelling and state estimation for mobile robots.

07/2021 – 12/2021
Intern – IDIAP Research Institute (Martigny, CH)
Robot Learning and Interaction Group – supervisor: Dr. Sylvain Calinon.
- Dealt with probabilistic methods applied to robots.
- Dived into probabilistic modeling of environments and ergodic trajectory planners.

02/2020 – 08/2024
Collaborator – Politecnico di Torino (IT)
Courses:
- 2nd level Master in *Space Exploration and Development Systems*:
  Gave lectures on Guidance, Navigation and Control (GNC) algorithms, and hardware and software technologies for aerospace.
- *Flight Simulation*, Master of Science in Aerospace Engineering:
  Introduced students to C++/Python programming in ROS under a Linux environment.

Education

11/2019 – 11/2023
Ph.D. in Aerospace Engineering – Politecnico di Torino (IT)
Thesis title: *Bayesian-based algorithms for Modeling and Identification for Autonomous Robotic Systems.*
- Applied Gaussian process regression to ground robots for a data-efficient modelling of their surroundings using depth sensors, as well as for identifying their dynamics.
- Developed and tested Gaussian process-based algorithms onto customized ground robotic platforms with limited computational resources for real-time applications.

2017 – 2019
M.Sc., Mechatronic Engineering – Politecnico di Torino (IT)
Thesis title: *Design and Testing of Indoor UAS Control Techniques.* GPA: 110/110

2013 – 2017
B.Sc., Mechanical Engineering – Politecnico di Milano (IT)

Research Publications

1. D. Carminati, "Parallel Gaussian process with kernel approximation in CUDA," 2024. URL: https://arxiv.org/abs/2403.12797

2. I. D. D. M. De Pierrepont Franzetti, R. Parin, D. Carminati, and E. Capello, "Modelling of ground and ceiling effects for quadcopters based on experimental data," in *2024 International Conference on Unmanned Aircraft Systems (ICUAS)*, 2024, pp. 405–412. DOI: 10.1109/ICUAS60882.2024.10557056

3. D. Carminati, *Bayesian-based algorithms for Modeling and Identification for Autonomous Robotic Systems*. Politecnico di Torino, 2023, Doctoral thesis.

4. M. Mancini, E. I. Trombetta, D. Carminati, and E. Capello, "Adaptive sliding mode control with artificial potential field for ground robots in precision agriculture," in *2023 IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor)*, 2023, pp. 325–330. DOI: 10.1109/MetroAgriFor58484.2023.10424132

5. E. I. Trombetta, D. Carminati, and E. Capello, "Nonlinear UGV Identification Methods via the Gaussian Process Regression Model for Control System Design," *Applied Sciences*, vol. 12, no. 22, p. 11 769, 2022.

6. E. I. Trombetta, I. D. D. M. de Pierrepont, D. Carminati, M. Scanavino, and E. Capello, "Data-Driven Identification Method and Simulation Modeling of a Ground Robot," en, in *2021 IEEE International Workshop on Metrology for AeroSpace*, 2021, p. 6.

7. I. D. D. M. de Pierrepont, D. Carminati, M. Scanavino, E. Capello, et al., "Model-In-the-Loop Testing of Control Systems and Path Planner Algorithms for QuadRotor UAVs," in *2020 International Conference on Unmanned Aircraft Systems (ICUAS)*, IEEE, 2020, pp. 1809–1818.