Mattia Piccinini

Humboldt Post-doctoral Fellow
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LinkedIn | Research Gate | Google Scholar

Research Interests

My research lies at the intersection of **robotics**, **machine learning**, and **control** engineering. I develop algorithms for real-time trajectory planning, control, and state estimation, with a focus on **mobile ground robots** in uncertain, dynamic environments. I like to integrate **prior knowledge** of the robot dynamics into learning-based methods, such as neural networks, to enhance **generalization** to unseen scenarios with minimal training data.

Education

11/2019 – 04/2024 **Ph.D. in Autonomous Systems**, University of Trento, Italy
Doctorate awarded with highest distinction (*summa cum laude*)
Ph.D. thesis: *Artificial Drivers for Online Time-Optimal Vehicle Trajectory Planning and Control* [pdf].
Supervisor: Prof. Francesco Biral
Date of the defense: 12/04/2024

09/2017 – 10/2019 **M.Sc. in Mechatronics Engineering**, University of Trento, Italy
Final grade: 110/110 *summa cum laude*
GPA: 30/30, 80% exams with maximum score, 60% exams passed with honors
Thesis: *Path planning and control of self-driving vehicles at the limits of handling* [pdf].

09/2014 – 09/2017 **B.Sc. in Industrial Engineering**, University of Trento, Italy
Final grade: 110/110 *summa cum laude*
GPA: 30/30, 90% exams with maximum score, 60% exams passed with honors
Thesis: *Degradation of glycol-based cooling fluids causing corrosion in machine tools refrigeration circuits*. The thesis was carried out in cooperation with the companies Pama S.p.A. and Rittal GmbH.

09/2009 – 06/2014 **Scientific High School Diploma**
Liceo Scientifico A. Rosmini, Rovereto, Italy
Final grade: 100/100

Research Experience

02/2026 – present **Humboldt Post-doctoral Fellow**
Technical University of Munich, Munich, Germany
Supervisor: Prof. Johannes Betz

12/2024 – 01/2026 **TUM Global Post-doctoral Fellow**
Technical University of Munich, Munich, Germany
Supervisor: Prof. Johannes Betz

04/2024 – 11/2024 **Post-doctoral Researcher**
University of Trento, Trento, Italy
Supervisor: Prof. Francesco Biral

Research Experience (continued)

03/2022 – 06/2022 **Visiting Ph.D. Student**
Universität der Bundeswehr, Munich, Germany
Supervisor: Prof. Matthias Gerdts

Teaching and Supervision Experience

07/2025 – present **Teaching Assistant**, Technical University of Munich, Germany
Courses of:
- *Autonomous Vehicles: Motion Planning and Decision Making*
- *Ethical Robot Systems*
- *F1TENTH: Autonomous Driving Hands-on*

Responsibilities:
- Preparation of slides and materials for selected lectures.
- Lecturer for selected lectures.
- Support with exam preparation and correction.

09/2021 – 02/2022
09/2020 – 02/2021
11/2019 – 02/2020 **Teaching Assistant**, EIT Digital Master School, University of Trento, Italy
Course of *Vehicle Dynamics, Planning and Control of Robotic Cars*.
- Preparation of lecture slides and assignments.
- Holding lectures and exercise sessions.
- Grading assignments and providing feedback to students.

03/2025 – 02/2026 **Program Assistant**, Robotics Institute Germany, Germany
Assistance in the creation of a new Master of Science in AI-based Robotics across different universities in Germany.
- Definition of requirements from the industry and research community.
- Survey-based analysis of strengths and weaknesses of the current academic educational landscape in robotics.

2025 – present **Thesis Co-Supervisor**, Technical University of Munich, Germany
- 6 Ph.D. Students
- 5 Master Students
- 2 Visiting Ph.D. Students

2019 – present **Thesis Co-Supervisor**, University of Trento, Italy
- 1 Ph.D. Student
- 9 Master Students

2021 – 2022 **Thesis Co-Supervisor**, EIT Digital Master School (EU)
- 1 Master Student
- 1 Term Project

2020 – 2021 **Thesis Co-Supervisor**, HAN University of Applied Sciences, Netherlands
- 1 Master Student

Work Experience

09/2018 – 06/2019 **Control and Simulation Engineer**
Formula SAE Project, Dynamics and Modeling Team, University of Trento, Italy
- Development of vehicle multibody models to validate vehicle controllers.
- Parameter optimization for the mechatronic powertrain.

09/2017 – 07/2018 **Mechanical Design Engineer**
Formula SAE Project, Powertrain Design Team, University of Trento, Italy
- Responsible for the mechanical transmission unit.

Work Experience (continued)

06/2016 – 08/2017 **Cooling System Engineer**
Formula SAE Project, Cooling System Design Team, University of Trento, Italy
- Design and manufacturing of the cooling system for an electric FSAE vehicle.

08/2018 – 09/2018 **Engineering Internship**
Pama S.p.A., Rovereto (Italy)
- Design of innovative solutions for the kinematic chain in a large-scale, high-precision milling machine divider.

09/2016 **Engineering Internship**
Pama S.p.A., Rovereto (Italy)
- Experimental setup to investigate corrosion phenomena arising from the degradation of glycol-based cooling fluids within machine tool circuits.

02/2016

09/2015 **Engineering Internship**
02/2015 Pama S.p.A., Rovereto (Italy)
- Design and analysis of mechanical and hydraulic assemblies for large-scale high-precision milling and boring machine tools.

Publications and Patents

Metric	Value
N. journal papers	17 (7 of which are under review)
N. conference papers	20 (8 of which are under review)
N. patents	2 (1 pending)
N. citations (Google Scholar)	289
h-index (Google Scholar)	11

Peer-Reviewed Journal Papers

1. Y. Gao, M. Piccinini, Y. Zhang, D. Wang, K. Moller, R. Brusnicki, B. Zarrouki, A. Gambi, J. F. Totz, K. Storms, S. Peters, A. Stocco, B. Alrifaee, M. Pavone, and J. Betz, "Foundation models in autonomous driving: A survey on scenario generation and scenario analysis," *IEEE Open Journal of Intelligent Transportation Systems*, pp. 1–1, 2026. DOI: 10.1109/OJITS.2026.3660686.

2. M. Piazza, M. Piccinini, S. Taddei, F. Biral, and E. Bertolazzi, "Real-time velocity profile optimization for time-optimal maneuvering with generic acceleration constraints," *IEEE Robotics and Automation Letters*, vol. 11, no. 2, pp. 1674–1681, 2026. DOI: 10.1109/LRA.2025.3643297.

3. F. Jahncke, B. Zarrouki, M. Piccinini, J. D'sa, D. Isele, S. Bae, and J. Betz, "Differentiable weights-varying nonlinear mpc via gradient-based policy learning: An autonomous vehicle guidance example," *IEEE Robotics and Automation Letters*, vol. 11, no. 3, pp. 3724–3731, 2026. DOI: 10.1109/LRA.2026.3662644.

4. M. Piccinini, S. Taddei, E. Pagot, E. Bertolazzi, and F. Biral, "How optimal is the minimum-time manoeuvre of an artificial race driver?" *Vehicle System Dynamics*, vol. 63, no. 12, pp. 2213–2240, 2025. DOI: 10.1080/00423114.2024.2407176.

5. M. Piccinini, M. Zumerle, J. Betz, and G. Pietro Rosati Papini, "A road friction-aware anti-lock braking system based on model-structured neural networks," *IEEE Open Journal of Intelligent Transportation Systems*, vol. 6, pp. 522–536, 2025. DOI: 10.1109/OJITS.2025.3563347.

6. M. Piccinini, S. Gottschalk, M. Gerdts, and F. Biral, "Computationally efficient minimum-time motion primitives for vehicle trajectory planning," *IEEE Open Journal of Intelligent Transportation Systems*, vol. 5, pp. 642–655, 2024. DOI: 10.1109/OJITS.2024.3476540.

7. M. Piccinini, S. Taddei, M. Larcher, M. Piazza, and F. Biral, "A physics-driven artificial agent for online time-optimal vehicle motion planning and control," *IEEE Access*, vol. 11, pp. 46 344–46 372, 2023. DOI: 10.1109/ACCESS.2023.3274836.

8. M. D. Lio, M. Piccinini, and F. Biral, "Robust and sample-efficient estimation of vehicle lateral velocity using neural networks with explainable structure informed by kinematic principles," *IEEE Transactions on Intelligent Transportation Systems*, pp. 1–15, 2023. DOI: 10.1109/TITS.2023.3303776.

9. M. Piccinini, M. Larcher, E. Pagot, D. Piscini, L. Pasquato, and F. Biral, "A predictive neural hierarchical framework for on-line time-optimal motion planning and control of black-box vehicle models," *Vehicle System Dynamics*, vol. 61, no. 1, pp. 83–110, 2023. DOI: 10.1080/00423114.2022.2035776. eprint: https://doi.org/10.1080/00423114.2022.2035776.

10. E. Pagot, M. Piccinini, E. Bertolazzi, and F. Biral, "Fast planning and tracking of complex autonomous parking maneuvers with optimal control and pseudo-neural networks," *IEEE Access*, vol. 11, pp. 124 163–124 180, 2023. DOI: 10.1109/ACCESS.2023.3330431.

Peer-Reviewed Journal Papers *Under Review*

1. T. Screiter, M. Piccinini, J. Dittes, L. Küssel, J. Betz, and A. J. Lilienthal, "Robotics master's education in germany: National landscape and coordination pathways," *Educational Technology & Society*, 2026, under review.

2. A. Mungiello, F. Jahncke, S. Santini, J. Betz, G. P. R. Papini, and M. Piccinini, "Model-structured neural networks for vehicle dynamics learning near the limits," *IEEE Open Journal of Intelligent Transportation Systems*, 2026, under review.

3. Z. Li, B. Zhou, M. Piccinini, C. Hu, B. Zarrouki, R. Mengharam, and L. Xie, "Evo-mpcc: Enhanced velocity optimization with learning-based auto-tuning for real-time vehicle trajectory planning," *Robotics and Autonomous Systems*, 2026, under review.

4. M. Piazza, A. Langmann, F. Biral, J. Betz, M. Piccinini, "Beyond the apex: Online minimum-time velocity planning on three-dimensional paths with variable friction," *IEEE Robotics and Automation Letters*, 2026, under review.

5. A. Langmann, S. Kohl, L. Ögretmen, M. Piccinini, and J. Betz, "A multi-stage time-variant motion planner for agile autonomous driving maneuvers," *IEEE Open Journal of Intelligent Transportation Systems*, 2025, under review.

6. D. Wang, R. Brusnicki, Z. Lai, Y. Wu, M. Piccinini, R. Yang, W. Li, and J. Betz, "Extrospective prediction for autonomous driving in emergency cut-in scenarios," *IEEE Transactions on Intelligent Transportation Systems*, 2025, under review.

7. S. Goblirsch, M. Piccinini, J. Betz, and M. Lienkamp, "Multidirectional gaussian-process tire models for kalman filtering in vehicle dynamics state estimation," *Vehicle System Dynamics*, 2025, under review.

Peer-Reviewed Conference Papers

1. Y. Gao, M. Piccinini, R. Brusnicki, Y. Zhang, and J. Betz, "Nurisk: A visual question answering dataset for agent-level risk assessment in autonomous driving," in *2026 IEEE International Conference on Robotics and Automation (ICRA)*, accepted, 2026.

2. M. Piccinini, S. Taddei, J. Betz, and F. Biral, "Kineto-dynamical planning and accurate execution of minimum-time maneuvers on three-dimensional circuits," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 1–7. DOI: 10.1109/ICRA55743.2025.11127446.

3. M. Kaufeld, M. Piccinini, and J. Betz, "Mp-rbfn: Learning-based vehicle motion primitives using radial basis function networks," in *2025 IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, 2025, pp. 1262–1269. DOI: 10.1109/ITSC60802.2025.11423753.

4. Y. Gao, M. Piccinini, K. Moller, A. Alanwar, and J. Betz, "From words to collisions: Llm-guided evaluation and adversarial generation of safety-critical driving scenarios," in *2025 IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, 2025, pp. 2134–2141. DOI: 10.1109/ITSC60802.2025.11423486.

5. M. Piccinini, A. Mungiello, G. Jank, G. P. R. Papini, F. Biral, and J. Betz, "Model-structured neural networks to control the steering dynamics of autonomous race cars," in *2025 IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, 2025, pp. 4129–4136. DOI: 10.1109/ITSC60802.2025.11423721.

6. F. Werner, S. Sagmeister, M. Piccinini, and J. Betz, "A quasi-steady-state black box simulation approach for the generation of g-g-g-v diagrams," in *2025 IEEE Intelligent Vehicles Symposium (IV)*, 2025, pp. 2503–2509. DOI: 10.1109/IV64158.2025.11097491.

7. B. Zhou, B. Zarrouki, M. Piccinini, C. Hu, L. Xie, and J. Betz, "Safe reinforcement learning with a predictive safety filter for motion planning and control: A drifting vehicle example," in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025, pp. 4196–4203. DOI: 10.1109/IROS60139.2025.11246272.

8. S. Taddei, M. Piccinini, and F. Biral, "Biasing the driving style of an artificial race driver for online time-optimal maneuver planning," in *2025 IEEE Intelligent Vehicles Symposium (IV)*, 2025, pp. 640–647. DOI: 10.1109/IV64158.2025.11097381.

9. S. Gottschalk, M. Gerdts, and M. Piccinini, "Reinforcement learning and optimal control: A hybrid collision avoidance approach," in *Proceedings of the 10th International Conference on Vehicle Technology and Intelligent Transport Systems - VEHITS*, INSTICC, SciTePress, 2024, pp. 76–87, ISBN: 978-989-758-703-0. DOI: 10.5220/0012569800003702.

10. M. Piazza, M. Piccinini, S. Taddei, and F. Biral, "Mptree: A sampling-based vehicle motion planner for real-time obstacle avoidance," 10, 17th IFAC Symposium on Control of Transportation Systems CTS 2024, vol. 58, 2024, pp. 146–153. DOI: https://doi.org/10.1016/j.ifacol.2024.07.332.

11. M. Piccinini, S. Taddei, M. Piazza, and F. Biral, "Impacts of g-g-v constraints formulations on online minimum-time vehicle trajectory planning," 10, 17th IFAC Symposium on Control of Transportation Systems CTS 2024, vol. 58, 2024, pp. 87–93. DOI: https://doi.org/10.1016/j.ifacol.2024.07.323.

12. E. Pagot, M. Piccinini, and F. Biral, "Real-time optimal control of an autonomous rc car with minimum-time maneuvers and a novel kineto-dynamical model," in *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020, pp. 2390–2396. DOI: 10.1109/IROS45743.2020.9340640.

Peer-Reviewed Conference Papers *Under Review*

1. R. Brusnicki, M. Piccinini, and J. Betz, "How well do vision-language models understand sequential driving scenes? a sensitivity study," in *2026 IEEE 29th International Conference on Intelligent Transportation Systems (ITSC)*, under review, 2026.

2. G. Jank, M. Piccinini, S. Wenk, P. Pitschi, J. Betz, and B. Lohmann, "Benchmarking empirical and learning-based approaches for feedforward steering control in autonomous racing," in *2026 IEEE 29th International Conference on Intelligent Transportation Systems (ITSC)*, under review, 2026.

3. D. Wang, H. Ye, Z. Liang, Z. Sun, Z. Lu, Y. Zhang, Y. Zhao, Y. Gao, M. Seegert, F. Schäfer, H. Qin, W. Li, L. Palmieri, F. Jahncke, M. Piccinini, and J. Betz, "Target-bench: Can video world models achieve mapless path planning with semantic targets?" In *19th European Conference on Computer Vision (ECCV)*, under review, 2026.

4. K. Moller, R. Stroop, M. Piccinini, A. Langmann, and J. Betz, "Learning to sample: Reinforcement learning-guided sampling for autonomous vehicle motion planning," in *2026 IEEE 29th International Conference on Intelligent Transportation Systems (ITSC)*, under review, 2026.

5. A. Langmann, F. P. de Araujo, M. Piccinini, and J. Betz, "A hybrid sampling-based trajectory plannerwith game-theoretic guidance for autonomous racing," in *2026 IEEE 29th International Conference on Intelligent Transportation Systems (ITSC)*, under review, 2026.
6. M. Piccinini, P. Zambiasi, A. Mungiello, M. Piazza, F. Jahncke, and J. Betz, "Trajectory planning and control near the limits: An open experimental benchmark on the roboracer platform," in *2026 IEEE 29th International Conference on Intelligent Transportation Systems (ITSC)*, under review, 2026.
7. Y. Gao, W. Miao, M. Piccinini, H. Wang, Q. Song, and J. Betz, "Chat2scenic: An iterative rag-based framework for scenario generation in autonomous driving," in *2026 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, under review, 2026.
8. Y. Gao, D. Hua, M. Piccinini, F. R. Schäfer, and J. Betz, "StyleVLA: Driving Style-Aware Vision Language Action Model for Autonomous Driving," in *2026 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, under review, 2026.

Peer-Reviewed Workshop Papers

1. M. Piazza, M. Piccinini, S. Taddei, F. Biral, and E. Bertolazzi, "Fbga: A forward-backward method for online time-optimal velocity planning with generic acceleration constraints," in *2nd German Robotics Conference*, 2026. URL: https://www.mos.ed.tum.de/fileadmin/w00ccp/avs/_my_direct_uploads/Mattia.pdf.
2. R. Brusnicki, M. Piccinini, and J. Betz, "Bridging the loco-manipulation disconnect: Dynamic whole-body impulse control on floating-base robots," in *2nd German Robotics Conference*, 2026. URL: https://www.mos.ed.tum.de/fileadmin/w00ccp/avs/_my_direct_uploads/Roberto.pdf.
3. Y. Gao, M. Piccinini, and J. Betz1, "Towards whole-body vla: A scalable data collection framework for quadrupedal mobile manipulators," in *2nd German Robotics Conference*, 2026. URL: https://www.mos.ed.tum.de/fileadmin/w00ccp/avs/_my_direct_uploads/Yuan.pdf.
4. M. Piccinini, M. Zumerle, J. Betz, and G. P. R. Papini, "Model-structured neural networks for road friction-aware anti-lock braking systems," in *Conference AUTOMATICA.IT*, 2025.
5. S. Taddei, M. Piccinini, and F. Biral, "From early to late apexes: Biasing the driving style of online time-optimal maneuver planning," in *Conference AUTOMATICA.IT*, 2025.
6. M. Piccinini, S. Gottschalk, M. Gerdts, and F. Biral, "Neural motion primitives for online time-optimal vehicle trajectory planning," in *Conference AUTOMATICA.IT*, 2024.
7. S. Taddei, M. Piccinini, E. Pagot, and F. Biral, "Artificial racing coach: Teaching humans how to maximize a racing vehicle's performance and drive at its limits," in *Conference AUTOMATICA.IT*, 2024.
8. M. Piccinini, S. Taddei, M. Larcher, M. Piazza, and F. Biral, "A physics-driven framework for online minimum-time vehicle motion planning and control," in *Conference AUTOMATICA.IT*, 2023.
9. E. Pagot, M. Piccinini, A. Plebe, E. Bertolazzi, and F. Biral, "Real-time autonomous parking in unstructured scenarios with an indirect optimal control approach," in *Workshop Behavior-Driven Autonomous Driving in Unstructured Environments (BADUE), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022. URL: https://obj.umiacs.umd.edu/badue-accepted/8.pdf.

Other Publications

1. M. Piccinini and S. Mariano, "Localization and control of autonomous vehicles in an urban intersection scenario," 2019. URL: https://www.researchgate.net/publication/334945954_Localization_and_Control_of_Autonomous_Vehicles_in_an_Urban_Intersection_Scenario.

Invited Talks

1. M. Piccinini, "Physics-Encoded Trajectory Planning and Control: From Racing Cars to General Robotics", *Invited Talk*, University of Verona, 2026.
2. M. Piccinini, "Physics-Guided Motion Generation and Control: From Autonomous Racing Towards General Robotics", *Invited Talk*, Eindhoven University of Technology, 2025.
3. M. Piccinini and G. P. R. Papini, "NNodely: An Open Framework for Model-Structured Neural Networks in Robotics", *Invited Talk*, Workshop series organized by the Ekumen company, 2025.
4. M. Piccinini, "Artificial Drivers to Learn the Vehicle Dynamics, Plan and Execute Online Time-Optimal Maneuvers", *Invited Talk*, Technical University of Munich, 2024.
5. M. Piccinini and G. P. R. Papini, "Model-Structured Neural Networks to Model and Control Physical Systems", *Invited Talk*, Seminar for PhD students, University of Trento, 2024.
6. M. Piccinini, "Virtual race drivers for planning and control with robotic cars", *Invited Talk*, Universität der Bundeswehr, Munich, 2022.

Poster Sessions

1. M. Piccinini, A. Mungiello, J. Betz, and G. P. R. Papini, "Model-Structured Neural Networks to Model & Control Robots", *Late-Breaking Results Poster Session*, International Conference on Robotics and Automation (ICRA), Atlanta, USA, 2025.
2. M. Piccinini, S. Taddei, and F. Biral, "Artificial Race Driver", *Poster Session at the Industrial Engineering Day*, University of Trento, 2023.
3. M. Piccinini, E. Pagot, and S. Taddei, "Virtual Driver to Control Race Cars near the Limits", *PhDII Poster Session*, University of Trento, 2022.
4. M. Piazza and M. Piccinini, "MPTree: Motion Primitive Tree Exploration for Trajectory Planning with Dynamic Obstacle Avoidance", *Poster Session at the Industrial Engineering Day*, University of Trento, 2022.

Patents

1. F. Jahncke, B. Zarrouki, M. Piccinini, J. D'sa, D. Isele, S. Bae, and J. Betz, "Differentiable Weights-Varying Nonlinear MPC via Gradient-Based Policy Learning: An Autonomous Vehicle Guidance Example", Patent pending, 2026.
2. M. D. Lio, F. Biral, and M. Piccinini, "Device and method, based on neural networks, for estimating the lateral speed of vehicles", WO2023166536A1, 2023. URL: `https://patents.google.com/patent/WO2023166536A1/en?oq=PCT%2fIT2023%2f050058`.

Awards & Funding

02/2026 **Seal of Excellence for Marie Skłodowska-Curie Post-doctoral Fellowship**
Project evaluation: 90.6% (Seal of Excellence). Not funded due to budget limitations.

12/2025 **Humboldt Post-doctoral Fellowship**
2-year funding for post-doctoral researchers, following the evaluation of a research proposal (**success rate** $< 20\%$).

Best Poster Award
German Autonomy Summit, Munich (Germany), 2025 (3^{rd} place).

10/2025 **Best Workshop Paper Award**
2025 IEEE IROS conference, Workshop on Planning, Perception and Navigation for Intelligent Vehicles.

Awards & Funding (continued)

09/2025 **Best Ph.D. Thesis Award**
Issued by the journal *MDPI Vehicles*.

08/2025 **IEEE ITSS Best Dissertation Award**
Issued by the IEEE Intelligent Transportation Systems Society.

IEEE IES-SYPA Travel Award
Issued by the IEEE Industrial Electronics Society (IES) for participation in the 2025 IEEE IROS conference (**success rate** $< 10\%$).

06/2025 **Best Paper Award Finalist**
2025 IEEE Intelligent Vehicles (IV) Symposium.

03/2025 **EuroTech Visiting Researcher Award**
15-day research travel grant to collaborate with the Eindhoven University of Technology, following a competitive selection of a research proposal.

12/2024 **TUM Global Post-doctoral Fellowship**
2-year funding for early-career researchers, following the evaluation of a research proposal (10 funded positions, **success rate** $< 10\%$).

07/2024 **IFAC Young Author Award**
Awarded at the 17^{th} IFAC Symposium on Control in Transportation Systems, Cyprus.

05/2024 **Best Paper Award Finalist**
10^{th} International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS).

04/2024 **Ph.D. Graduation with Highest Distinction** (*summa cum laude*)

11/2023 **Best Poster Award**
Industrial Engineering Day, University of Trento (Italy).

10/2019 **M.Sc. Graduation with Highest Distinction** (*summa cum laude*)

09/2017 **B.Sc. Graduation with Highest Distinction** (*summa cum laude*)

Projects

05/2025 – present **Differentiable Software Stacks for Autonomous Driving**
Collaboration with the Honda Research Institute company (USA).
Responsibilities: Support with project development and reporting.

01/2024 – 11/2024 **Digital Twin Vehicle Models for Energy Management, Performance Optimization and Parameter Estimation**
Collaboration with the Stellantis company (Italy).
Responsibilities: Project implementation and reporting.

11/2019 – 11/2021 **Artificial Drivers of Autonomous Race Cars**
Collaboration with the AnteMotion S.r.l. company (Italy).
Responsibilities: Whole project implementation and reporting.

Academic Engagement

Editorial Activities

- **Associate Editor**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- **Associate Editor**, IEEE International Conference on Intelligent Transportation Systems (ITSC)
- **Invited Session Organizer**, Invited Session on "Automated Vehicles at the Limits: Lessons and Opportunities from the Racetrack", IEEE International Conference on Intelligent Transportation Systems (ITSC), 2026

Conference Committees

- **Chair** of the session "Path Planning", at the Automatica.it conference, Bolzano (Italy), 2024
- **Co-chair** of the session "Modeling, Control, and Optimization of Transportation Systems", at the 17th IFAC Symposium on Control in Transportation Systems (CTS), Ayia Napa (Cyprus), 2024

University Service

- **TUM Internationalization** support: organized the research visits of Prof. Basilio Lenzo, Prof. Francesco Biral, Dr. Mattia Laurini, and the visiting Ph.D. students Aniello Mungiello and Gonçalo Torres to the Technical University of Munich, Professorship of Autonomous Vehicle Systems.
- **Examination Committee Member** for Bachelor and Master theses at the Technical University of Munich, Professorship of Autonomous Vehicle Systems.

Memberships

- IEEE Robotics and Automation Society (RAS)
- IEEE Intelligent Transportation Systems Society (ITSS)
- IEEE Industrial Electronics Society (IES)
- Società Italiana dei Docenti e Ricercatori di Automatica (SIDRA)
- Associazione Italiana per l'Intelligenza Artificiale (AIxIA)

Peer-Review Activities

Journals: IEEE Transactions on Intelligent Transportation Systems; IEEE Transactions on Vehicular Technology; IEEE Transactions on Mechatronics; IEEE Transactions on Industrial Electronics; IEEE Open Journal of Control Systems; IEEE Transactions on Control Systems Technology; IEEE Transactions on Robotics; IEEE Robotics and Automation Letters (RA-L); IEEE Access; Robotics and Autonomous Systems; Vehicle System Dynamics; Springer Nature - International Journal of Machine Learning and Cybernetics; Springer Optimization and Engineering; Springer Nature Communications; Mechanical Systems and Signal Processing; MDPI Vehicles; MDPI Machines; MDPI Electronics; MDPI Actuators; MDPI Drones; MDPI Symmetry; MDPI Applied Sciences; MDPI World Electric Vehicle Journal

Conferences: IEEE International Conference on Robotics and Automation (ICRA); IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS); IEEE Intelligent Vehicles Symposium (IV); IEEE International Conference on Intelligent Transportation Systems (ITSC); IEEE Conference on Decision and Control (CDC); IEEE Conference on Control Technology and Applications; IEEE International Conference on Real-time Computing and Robotics; IEEE International Conference on Advanced Motion Control; International Conference on System Theory, Control and Computing (ICSTCC); IFAC Symposium on Control in Transportation Systems.

Skills

Programming	Matlab, Simulink, Python, C/C++, Maple, Mathematica, Ruby
Machine Learning Frameworks	Tensorflow, Keras, PyTorch
Development Tools	GitHub, GitLab, Bitbucket
CAD Software	SolidWorks, Inventor, AutoCAD
Operating Systems	MacOS, Windows, Linux

Skills (continued)

Other Computer Skills	LaTeX, Microsoft Word, Microsoft Excel, Microsoft Power-Point, Apple Keynote, Apple Pages
Others	Driving licence B
Languages	English: full professional proficiency (Cambridge Certificate of Advanced English, level C1) German: upper-intermediate knowledge Italian: native

Personal Details and Interests

- Date of birth: 16/07/1995
- Nationality: Italian
- Personal interests: traveling, swimming, hiking

References

- Prof. Johannes Betz, Technische Universität München, München (Germany),
  phone: +49 89 289 10407, email: johannes.betz@tum.de
- Prof. Francesco Biral, University of Trento, Trento (Italy),
  phone: +39 (0)461 282513, email: francesco.biral@unitn.it
- Prof. Matthias Gerdts, Universität der Bundeswehr, München (Germany),
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