europass Curriculum vitae

PERSONAL INFORMATION

Mattia Laurini (He/Him)

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WORK EXPERIENCE

Apr 2023 – present — Research Fellow (RTD-A), University of Parma, Parma, Italy

5 year term

Academic Recruitment Field: 09/G1 “Systems and Control Engineering”

Academic Discipline: IINF–04/A “Systems and Control Engineering”

I am contributing to the Department research, addressing theoretical and experimental aspects of the field with a focus on autonomous vehicles and planning and control of robotic systems.

I am participating in the project funded under the National Recovery and Resilience Plan (NRRP) “Ecosystem for Sustainable Transition in Emilia-Romagna” (Ecosister) – Spoke 4. Smart mobility, housing and energy solutions – Work Package 1. Pedestrian and cyclist safety, high-quality cycling network, modelling mobility flows, multimodal systems and shared mobility, cybernetic mobility, video system.

I am also involved in the National Research Project (PRIN) “ACTIVA – Automatic Control of Total IntraVenous Anesthesia”, funded by the European Union – Next Generation EU”.

Jul 2022 – Mar 2023 — Postdoc, University of Parma, Parma, Italy

9 months

Scholarship funded by Ferrovie Emilia Romagna (FER)
“Analysis of the state of affairs, selection and evaluation of possible alternatives, in order to enhance the implications in terms of efficiency, effectiveness and cost-effectiveness as well as non-fungibility of the technological systems of command, control and signaling of railway traffic”.

Sep 2020 – Mar 2022 — Postdoc, University of Parma, Parma, Italy

18 months

Scholarship funded by University of Parma and Fondazione Cariparma
ECOCAR (Energy and Cost Optimization for Cooperative Autonomous Robots) project “Trajectory planning for autonomous vehicles in cooperative environments”.
Project focused on the design and implementation of a trajectory-planning algorithm for automated guided vehicles in industrial environments. Algorithm tested on real-life scenarios, improvements in travel times up to 14%.

Mar 2020 – Set 2020 — Postdoc, University of Parma, Parma, Italy

6 months

Scholarship funded by OCME SRL
“Development and implementation of a planning system for palletizing systems”.
Project focused on the development and implementation in C++ of a planning algorithm for palletizing machines based on Dynamic Programming. Algorithm tested on real-life industrial scenarios, solutions reproduce those designed by qualified engineers.

Nov 2018 – Nov 2019 — Postdoc, University of Parma, Parma, Italy

12 months

Scholarship funded by Regione Emilia-Romagna and OCME SRL
(Adaptive Robots for Industry 4.0) ROBOT-A project “intelligent planning system for robotic palletizers”.
Project focused on the design and implementation in MATLAB of a planning algorithm for palletizing machines based on the solution of Mixed Integer Linear Programming problems via Gurobi.

Set 2017 – Feb 2018 — Visiting Assistant in Research, Yale University, New Haven (CT) USA

6 months

Study of graph theory and control problems represented by multigraphs. Attended courses: Linear Systems (Professor A. Stephen Morse); Optimization Techniques (Professor Sekhar Tatikonda).

EDUCATION

2015–2018 — PhD in Information Technologies, University of Parma, Parma, Italy

Final evaluation: excellent Scholarship funded by Magneti Marelli SPA.
Thesis title: *Graph-based Optimization Algorithms with Applications to Trajectory Planning*

2012–2015 **Master's Degree in Mathematics, University of Parma, Parma, Italy**
Final grade: 110/110 cum laude (minimum passing grade: 66)
Thesis title: *Value Analysis of* C/C++ *Code via Abstract Interpretation*

2009–2012 **Bachelor's Degree in Mathematics, University of Parma, Parma, Italy**
Final grade: 104/110 (minimum passing grade: 66)
Thesis title: *Combinatorial Structures from Planar Nearrings*

2004–2009 **High School Diploma, Liceo Scientifico "G. Aselli", Cremona, Italy**
Final grade: 100/100 (minimum passing grade: 60)

PROFESSIONAL SERVICE

2025 Chair, Examination Board for the final examinations at ITS Academy, Parma IT

2025–present Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2025–present Member, IFAC Technical Committee on Control Education (TC 9.4)

2025–present Member, IEEE Technical Committee on Networks and Communication Systems

2024–present Member, IEEE Technical Committee on Smart Cities

2024–present Elected Member, Department Board (Representative of Researchers), Department of Engineering and Architecture, University of Parma

CONFERENCES

2025 IEEE 64th Conference on Decision and Control (CDC), Rio de Janeiro BR
Organizer of Invited Session "Analysis and Optimization of Urban Transportation Networks for Green Mobility", speaker

2025 Automatica.it (SIDRA National Conference), Perugia and Assisi IT
Speaker

2025 14th IFAC Symposium on Advances in Control Education (IFAC ACE), Budapest HU
Session chair, speaker

2024 IEEE 63th Conference on Decision and Control (CDC), Milan IT
Speaker at Invited Session "Network Traffic Modelling and Control"

2024 27° International meeting of the Transalpine Mathematical Rally Association (ARMT), Trequanda IT
Member "Functions and sequences" working group

2024 Automatica.it (SIDRA National Conference), Bolzano IT
Session chair, speaker

2023 26° International meeting of the Transalpine Mathematical Rally Association (ARMT), Faenza IT
Member "Functions and sequences" working group

2022 25° International meeting of the Transalpine Mathematical Rally Association (ARMT), Lyon FR
Member "Functions and sequences" working group

2021 Automatica.it (SIDRA National Conference), Virtual Edition, Catania IT
Speaker

2021 XV Congress of the Italian Society for Industrial and Applied Mathematics, Parma IT
Staff, organizer of industrial session "Mathematical problems in automation and robotics", speaker

2020 IEEE 59th Conference on Decision and Control (CDC), Virtual Edition, Jeju KR
Speaker

2020 Automatica.it (SIDRA National Conference), Virtual Edition, Cagliari IT
Speaker

2019 23° International meeting of the Transalpine Mathematical Rally Association (ARMT), Alghero IT
Member "Functions and sequences" working group

2019 Automatica.it (SIDRA National Conference), Ancona IT
Speaker

2019 XXI Congress of the Italian Mathematical Union (UMI), Pavia IT

2018 IEEE 57th Conference on Decision and Control (CDC), Miami (FL) USA
Speaker

2018 Automatica.it (SIDRA National Conference), Firenze IT

2017 Modeling and Optimization: Theory and Applications (MOPTA), Bethlehem (PA) USA
Speaker

2017 20th World Congress of the International Federation of Automatic Control (IFAC), Toulouse FR
Speaker

2016 IEEE 55th Conference on Decision and Control (CDC), Las Vegas (NV) USA
Speaker

2015 19° International meeting of the Transalpine Mathematical Rally Association (ARMT), Sedilo IT
Member "Functions and sequences" working group

SEMINARS

2025 Beyond the demo: ensuring robotic reliability in safety critical environments by D. Pachisia, Webinar
Organizer

2021 MATLAB in business, university and policy research, Parma IT
Invited speaker: "Trajectory planning for an automated guided vehicle with MATLAB"

2021 4° Seminar of Mathematics and Computer Science Alumni, Parma IT
Organizer

2018 3° Seminar of Mathematics and Computer Science Alumni, Parma IT
Invited speaker: "Dynamic Programming for autonomous parking"

PUBLICATIONS

International Journals

[1] L. Consolini, M. Laurini, M. Locatelli. A convex reformulation for speed planning of a vehicle under the travel time and energy consumption objectives, Automatica, 185: 112811, 2026

[2] V. Beltrami, L. Consolini, M. Laurini, M. Milanesi, M. Schiavo, A. Visioli. System realizations by mammillary models with an application to propofol pharmacokinetics, Systems & Control Letters, 208: 106309, 2026

[3] S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Speed planning by minimizing travel time and energy consumption, EURO Journal on Computational Optimization, 13: 100112, 2025

[4] M. Laurini, T. Llopis, N.Naz, L. Consolini, M. Milanesi, M. Schiavo, A. Visioli. Optimized Feedforward Control for the Co-administration of Propofol and Remifentanil for Induction of Hypnosis in General Anesthesia, IEEE Control Systems Letters, 9: 745–750, 2025

[5] M. Milanesi, L. Consolini, G. Di Credico, N. Latronico, M. Laurini, M. Paltenghi, M. Schiavo, A. Visioli. Human-imitating Control of Depth of Hypnosis Combining MPC and Event-based PID Strategies, IEEE Control Systems Letters, 4: 580–585, 2024

[6] L. Consolini, M. Laurini, M. Locatelli. A Dynamic Programming Approach for Cooperative Pallet-Loading Manipulators, IEEE Transactions on Automation Science and Engineering, 21 (4): 5280–5296, 2024

[7] S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Solution algorithms for the Bounded Acceleration Shortest Path Problem, IEEE Transactions on Automatic Control, 68 (3):1910–1917, 2023

[8] S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Shortest path with acceleration constraints: complexity and approximation algorithms, Computational Optimization and Applications, 83: 555–592, 2022

[9] M. Laurini, L. Consolini, M. Locatelli. A graph-based algorithm for optimal control of switched systems: An application to car parking, IEEE Transactions on Automatic Control, 66 (12): 6049–6055, 2021

[10] M. Laurini, L. Consolini, M. Locatelli. Optimizing cooperative pallet loading robots: A mixed integer approach, IEEE Robotics and Automation Letters, 6 (3): 5300–5307, 2021

[11] M. Schiavo, L. Consolini, M. Laurini, N. Latronico, M. Paltenghi, A. Visioli. Optimized feedforward control of propofol for induction of hypnosis in general anesthesia, Biomedical Signal Processing and Control, 66: 102476, 2021

[12] L. Consolini, M. Laurini, M. Locatelli, A. Minari. A solution of the minimum-time speed planning problem based on lattice theory, Journal of the Franklin Institute, 357 (12): 7617–7637, 2020

[13] L. Consolini, M. Laurini, M. Locatelli, F. Cabassi. Convergence Analysis of Spatial-Sampling Based Algorithms for Time-Optimal Smooth Velocity Planning, Journal of Optimization Theory and Applications, 184: 1083–1108, 2020

[14] L. Consolini, M. Laurini, M. Locatelli. Graph-based algorithms for the efficient solution of optimization problems involving monotone functions, Computational Optimization and Applications, 73 (1): 101–128, 2019

Patents

[1] P. Micelli, L. Consolini, M. Laurini, M. Locatelli, A. Furlan, M. Giorelli.
用于计算适于道路车辆的最优停车操纵的路径规划方法和相应系统, CN109215370B, 2022

[2] P. Micelli, L. Consolini, M. Laurini, M. Locatelli, A. Furlan, M. Giorelli. Path planning method for computing optimal parking maneuvers for road vehicles and corresponding system, EP3422133B1, 2021

[3] P. Micelli, L. Consolini, M. Laurini, M. Locatelli, A. Furlan, M. Giorelli. Path planning method for computing optimal parking maneuvers for road vehicles and corresponding system, US10960876B2, 2021

[4] P. Micelli, L. Consolini, M. Laurini, M. Locatelli, A. Furlan, M. Giorelli. Procedimento di pianificazione di percorso per il calcolo di manovre di parcheggio ottimale per veicoli stradali e sistema corrispondente, IT102017000073722A, 2018

Conference Proceedings

[1] R. Praxedes, A. Subramanian, S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Optimization methods to improve the quality of a cycling network under budget constraints, 2025 IEEE 64th Conference on Decision and Control (CDC), 4982–4987

[2] M. Milanesi, L. Consolini, G. Di Credico, N. Latronico, M. Laurini, M. Paltenghi, M. Schiavo, A. Visioli. Towards a Reduced-Order Model for Anesthesia: Identification of Propofol-Remifentanil Effect as a Single Synergic Drug, 2025 IEEE 64th Conference on Decision and Control (CDC), 5738–5743

[3] S. Ardizzoni, L. Consolini, L. Laurini, M. Locatelli. A MATLAB App for Teaching Multi-Objective Speed Planning: Minimizing Time and Energy Consumption, IFAC Symposium on Advances in Control Education - 14th ACE 2025, IFAC-PapersOnLine 59 (7): 105–110

[4] M. Laurini, I. Saccani, N. Naz, S. Ardizzoni, L. Consolini, M. Locatelli. Generalized Least Squares for Vehicle Traffic Estimation, 2025 33rd Mediterranean Conference on Control and Automation, 31–36

[5] M. Laurini, I. Saccani, S. Ardizzoni, L. Consolini, M. Locatelli. A Dynamic Programming Approach for Road Traffic Estimation, 2024 IEEE 63th Conference on Decision and Control (CDC), 4187–4192

[6] S. Ardizzoni, M. Laurini, R. Praxedes, L. Consolini, M. Locatelli. Identification of Cyclists' Route Choice Criteria, 2024 IEEE 63th Conference on Decision and Control (CDC), 6975–6980

[7] G. Di Credico, L. Consolini, M. Laurini, M. Locatelli, M. Milanesi, M. Schiavo, A. Visioli. A Branch and Bound method for the exact parameter identification of the PK/PD model for anesthetic drugs, 2024 IEEE 63th Conference on Decision and Control (CDC), 8754–8759

[8] L. Consolini, M. Laurini, A. Piazzi. Generalized Bang-Bang Control for Multivariable Feedforward Regulation, 2024 32nd Mediterranean Conference on Control and Automation, 506–511

[9] S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Efficient solution algorithms for the Bounded Acceleration Shortest Path problem, 2021 IEEE 60th Conference on Decision and Control (CDC), 5729–5734

[10] M. Schiavo, L. Consolini, M. Laurini, N. Latronico, M. Paltenghi, A. Visioli. Optimized robust combined feedforward/feedback control of propofol for induction of hypnosis in general anesthesia, 2021 IEEE International Conference on Systems, Man, and Cybernetics (SMC), 1266–1271

[11] M. Schiavo, L. Consolini, M. Laurini, N. Latronico, M. Paltenghi, A. Visioli. Optimized reference signal for induction of general anesthesia with propofol, 11th IFAC Symposium on Biological and Medical Systems BMS 2021, IFAC-PapersOnLine 54 (15): 7–12

[12] M. Laurini, L. Consolini, M. Locatelli. Fast numerical solution of optimal control problems for switched systems: An application to path planning, 2020 IEEE 59th Conference on Decision and Control (CDC), 4105–4110

[13] M. Laurini, L. Consolini, M. Locatelli. A Multigraph-Based Selective Update Method for the Efficient Solution of Dynamic Programming, 2018 IEEE 57th Conference on Decision and Control (CDC), 5916–5921

[14] M. Laurini, L. Consolini, M. Locatelli. A Consensus Approach to Dynamic Programming, 2017 20th World Congress of the International Federation of Automatic Control (IFAC), IFAC-PapersOnLine 50 (1): 8435–8440

[15] M. Laurini, P. Micelli, L. Consolini, M. Locatelli. A Jacobi-like acceleration for dynamic programming, 2016 IEEE 55th Conference on Decision and Control (CDC), 7371–7376

Technical Reports

[1] L. Consolini, M. Laurini, M. Locatelli. A convex reformulation for speed planning of a vehicle under the travel time and energy consumption objectives, arXiv:2510.24286 [math.OC], 2025

[2] S. Ardizzoni, L. Consolini, M. Laurini, M. Locatelli. Hidden convexity property of a speed planning problem, arXiv:2503.09424 [math.OC], 2025

[3] L. Consolini, M. Laurini, M. Locatelli, D. Lodi Rizzini. A Second-Order Lower Bound for Globally Optimal 2D Registration, arXiv:1901.09641v2 [cs.RO], 2020

[4] A. Aimi, M. Diligenti, M. Laurini. Fast Multipole Boundary Element Method: Applications to 2D Elliptic Problems, Quaderni del Dipartimento di Matematica e Informatica, Università degli Studi di Parma, №523, 2015

OTHER STUDIES

2018 (3 days) Optimization Methods for Decision Making over Networks, SIDRA PhD Summer School
Italian Control Systems Society (SIDRA), Bertinoro IT

2017 (1 week) Recent Advances from Approximation Theory to Structured Numerical Linear Algebra
CIME-EMS Summer School on Splines and PDEs, Cetraro IT

2017 (1 week) Local methods for nonlinear systems and control
2017 European Embedded Control Institute International Graduate School on Control (EECI-IGSC-2017) Padova IT

2016 (1 week) SIDRA PhD Summer School
Italian Control Systems Society (SIDRA), Bertinoro IT

2016 (1 week) SCSM | Scuola di Calcolo Scientifico con MATLAB
Mathworks, University of Palermo, Palermo IT

2016 (3 days) An introduction to modeling and control of systems governed by PDEs
IFAC/IEEE CSS SUMMER SCHOOL, University of Bologna, Bertinoro IT

2013 (1 month) Summer Courses in Mathematics
Scuola Matematica Interuniversitaria, University of Perugia, Perugia IT

TEACHING ACTIVITIES

Lecturer, University of Parma, Parma, Italy

2023 – present Multivariable Systems for Master's students in Computer Engineering.

2023 – present Control Engineering Laboratory for Master's students in Computer Engineering.

Tutor, University of Parma, Parma, Italy

2018 Mathematical Methods for Bachelor's students in Biotechnology.

2018 Mathematical Analysis I for Bachelor's students in Mathematics.

2017–2018 Mathematics for Bachelor's students in Chemistry.

2017–2018 Algorithms and Data Structures for Bachelor's students in Computer Science.

2016–2017 Mathematics for Bachelor's students in Chemistry.

2014–2015 Mathematics for Bachelor's students in Architectural Science.

COMPUTER LANGUAGES

MATLAB, C/C++, LaTeX.

LANGUAGES

Italian: Mother tongue English: Advanced level German: Basic knowledge

2013–2014 (8 months) German language course A1, Leitmotiv London School, Parma, IT

OTHER ACTIVITIES

2024–present Governing Council Member, Italian Mathematical Rally Association – Parma section, IT

2019–2024 Governing Council Member, Transalpine Mathematical Rally Association – Parma section, IT

2018–present Organizing Committee Member, Transalpine Mathematical Rally, Parma IT

2014–2016, 2018 Volunteer, European Researchers' Night, University of Parma IT

2013–2017 Volunteer, Final tournament of the Transalpine Mathematical Rally, University of Parma IT