LORENZO FIASCHI

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ACADEMIC EXPERIENCE

Postdoctoral researcher, Department of Mechanical Engineering, ETH — 2025 - now

Postdoctoral researcher, Department of Information Engineering, University of Pisa — 2023 - 2025

EDUCATION

Ph.D. of Information Engineering (Honors), University of Pisa — 2019 - 2023

Master of Computer Science and A.I. (Honors), University of Genoa [Cumulative GPA: 4.00] — 2017 - 2019

Bachelor of Computer Engineering (Honors), University of Pisa [Cumulative GPA: 3.83] — 2014 - 2017

GRANTS WON

RobotX Research Program grant[1] - RobotX Center for Robotics — 2026

Ph.D. students mobility grant[2] - Funded by University of Pisa — 2022

International workshop organization grant[3] - Funded by University of Pisa — 2020

SUPERVISION EXPERIENCE

Co-supervisor of 5 Ph.D. students on the following topics

- Optimal rule selection and testing in multi-agent systems — 1 student
- Karma economies for fair and efficient outcome selection — 1 student
- Fleet-environment co-design for automated environments — 1 student
- Constraint reinforcement learning for adversarial testing — 1 student
- Strategic monotone co-design in urban mobility — 1 student

Thesis supervisor for the following programs

Master of Mechanical Engineering, ETH Zurich, Switzerland — 5+ theses

Master of Artificial Intelligence and Data Engineering, University of Pisa, Italy — 5+ theses

TEACHING EXPERIENCE

Seminar — Fall 2025, 2026

Reinforcement Learning for Path Planning - Master of Mechanical Engineering — *ETH*

Assistant Lecturer — Spring 2020 - 2025

Reinforcement Learning - Master of Information Engineering - 20 hours - 50 students — *University of Pisa*

Assistant Lecturer — Fall 2019 - 2025

Elements of Programming - Bachelor of Information Engineering - 20 hours - 250 students — *University of Pisa*

[1] ENCODER – ENvironment CO-DEsign for autonomous mobile Robots – 124.000 CHF

[2] Best Ph.D. students – 3,000€

[3] Hardware accelerators for Deep Neural Networks and Machine Learning – 5,000€

RESEARCH PROJECTS CONTRIBUTION

NCCR Automation 2025 - now
Challenge: 2 - Responsible Automation
WP 2.1: Responsible Design (role: coordinator)

ESTRA - Efficient Safe Train Dynamics 2025 - now
Role: WP coordinator
WP: 4, 6 - Safety certification & driving rules optimization

FAIR - Future Artificial Intelligence Research 2023 - 2025
Spoke: 1 - Human-centered AI; Program: PNRR
WP: 2.3 - Exploiting Non-Standard Analysis to Empower Deep Neural Networks and Reinforcement Learning

TEXTAROSSA 2022 - 2023
Program: Horizon 2020
Topic: Mixed precision algorithms for HPC applications of optimization and machine learning

AWARDS

Best start-up idea contest - Funded by University of Modena and Reggio Emilia 2024

"Springer Young Researcher Prize"[4] - Funded by Springer Publisher 2019

"Francesca Paola Nicotra" scholarship[5] - Funded by Nicotra's family 2009

SERVICE TO THE RESEARCH COMMUNITY

Researcher Committee Member
Co-responsible for the organization of academic activities for the growth of young researchers 2025 - now

Keynote lecturer
ICORES24: Lexicographic Multi-Objective Optimization Using Infinite, Finite and Infinitesimal Numbers 2024

Co-organizer of the following events
Workshop on Responsible Automation, Zurich, Switzerland 2026
Workshop on Hardware accelerators for AI and HPC applications, Pisa, Italy 2020

Program committee member of the following conferences
IEEE Symposium on CISDA, Xiamen, China 2019

OTHER ROLES

Reference person for
Collaborations between the research group and the industrial partner Embotech AG 2025 - now

Committee member for
Postdoctoral researcher hiring within NCCR Automation project 2026 - now

Promoter of
Collaboration between CODEWIND project and Welfarist control group at IfA 2026 - now

[4] Best young researcher presentation at NUMTA 2019 – 500€ grant.
[5] Best city student – 3,000€ grant, ex-equo.

PUBLICATIONS

[1] **Fiaschi L.**, Rezaeizadeh A., El Bouharrouti N., Mastellone S., and Censi A. Stochastic degradation aware optimal fleet management with application to electric vehicles. *to appear*, 2026.

[2] Penlington M, **Fiaschi L.**, Censi A., , and Frazzoli E. Optimal rule design for homogeneous communities. *to appear*, 2026.

[3] **Fiaschi L.** and Censi A. Towards strategic interaction in monotone co-design problems. *to appear*, 2026.

[4] Li Y, **Fiaschi L.**, Censi A., , and Frazzoli E. Compatibility and future-proof testing for multi-agent systems. *to appear*, 2026.

[5] Penlington M, Zanardi A, **Fiaschi L.**, , and Frazzoli E. Lexicographic descent: A gradient-based approach to optimize totally ordered rulebooks via parametric scalarization. *under review*, 2026.

[6] Manzano A, Milojevic D, **Fiaschi L.**, Censi A, , and Frazzoli E. Co-design of onboard and infrastructure perception enables capital-efficient solutions as robot fleets scale. *under double-blind review*, 2026.

[7] Cococcioni M. and **Fiaschi L.** Linear programming with infinite, finite, and infinitesimal values in the right-hand side. *Applied Mathematics and Computation*, 486:129044, 2025, doi:10.1016/j.amc.2024.129044.

[8] **Fiaschi L.** and Cococcioni M. Informed deep hierarchical classification: a non-standard analysis inspired approach. *arXiv, doi:10.48550/arXiv.2409.16956*, 2024.

[9] Cococcioni M., Cudazzo A., **Fiaschi L.**, Pappalardo M., and Sergeyev Y. D. A new cutting plane method for lexicographic multi-objective integer linear programming. *Communications in Nonlinear Science and Numerical Simulation*, 129:107674, 2024, doi:10.1016/j.cnsns.2023.107674.

[10] **Fiaschi L.** and Cococcioni M. A non-Archimedean interior point method and its application to the lexicographic multi-objective quadratic programming. *Mathematics*, 10(23):4536, 2022, doi:10.3390/math10234536.

[11] Rossi F., **Fiaschi L.**, Cococcioni M., and Saponara S. Design and fpga synthesis of ban processing unit for non-archimedean number crunching. In Riccardo Berta and Alessandro De Gloria, editors, *Applications in Electronics Pervading Industry, Environment and Society*, pages 320–325, Cham, 2023, doi:10.1007/978-3-031-30333-3_43. Springer Nature Switzerland.

[12] Lai L., **Fiaschi L.**, Cococcioni C., and Kalyanmoy D. Pure and mixed lexicographic-paretian many-objective optimization: state of the art. *Natural Computing*, 1:1–16, 2022, doi:10.1007/s11047-022-09911-4.

[13] Cococcioni M., **Fiaschi L.**, and Lambertini L. On impure prisoners' dilemmas, folk theorems, and correlation devices. In *EARIE 2022 (VIENNA)*, 2022. to appear.

[14] Cococcioni M., **Fiaschi L.**, and Lermusiaux P. Game theory for unmanned vehicles path planning in the marine domain: state of the art and new possibilities. *Journal of Maritime Science and Engineering*, 9:1175, 2021, doi:10.3390/jmse9111175.

[15] Benci V., Cococcioni M., and **Fiaschi L.** Non-standard analysis revisited: an easy axiomatic presentation oriented towards numerical applications. *Applied Mathematics and Computer Science*, 32(1):65–80, 2022, doi:10.34768/amcs-2022-0006.

[16] Cococcioni M., **Fiaschi L.**, and Lambertini L. Computing optimal decision strategies using the infinity computer: the case of non-Archimedean zero-sum games. In *Numerical Infinities and Infinitesimals in Optimization*, pages 271–295. Springer, 2021, doi:10.1007/978-3-030-93642-6_11.

[17] Lai L., **Fiaschi L.**, Cococcioni M., and Deb K. On the use of grossone methodology for handling priorities in multi-objective evolutionary optimization. In *Numerical Infinities and Infinitesimals in Optimization*, pages 183–218. Springer, 2021, doi:10.1007/978-3-030-93642-6_8.

[18] Lai L., **Fiaschi L.**, Cococcioni M., and Deb K. Solving mixed Pareto-lexicographic multi-objective optimization problems: The case of priority levels. *IEEE Transaction on Evolutionary Computation*, 25:971–985, 2021, doi:10.1109/TEVC.2021.3068816.

[19] Cococcioni M., **Fiaschi L.**, and Lambertini L. Non-Archimedean zero-sum games. *Journal of Computational and Applied Mathematics*, 393:113483, 2021, doi:10.1016/j.cam.2021.113483.

[20] Lai L., **Fiaschi L.**, Cococcioni M., and Deb K. Handling priority levels in mixed pareto-lexicographic many-objective optimization problems. *11th Edition of International Conference Series on Evolutionary Multi-Criterion Optimization (EMO2021)*, pages 362–374, 2021, doi:10.1007/978-3-030-72062-9_29.

[21] Cococcioni M. and **Fiaschi L.** The big-M method with the numerical infinite M. *Optimization Letters*, 15(7):2455–2468, 2021, doi:10.1007/s11590-020-01644-6.

[22] Lai L., **Fiaschi L.**, and Cococcioni M. Solving mixed Pareto-lexicographic multi-objective optimization problems: The case of priority chains. *Swarm and Evolutionary Computation*, 55:100687, 2020, doi:10.1016/j.swevo.2020.100687.

[23] **Fiaschi L.** and Cococcioni M. Non-Archimedean Game Theory: A numerical approach. *Applied Mathematics and Computation*, 409:125356, 2020, doi:10.1016/j.amc.2020.125356.

[24] **Fiaschi L.** and Cococcioni M. Generalizing Pure and Impure Iterated Prisoner's Dilemmas to the Case of Infinite and Infinitesimal Quantities. *In Numerical Computations: Theory and Algorithms*, pages 370–377, Cham, 2020. Springer International Publishing, doi:10.1007/978-3-030-40616-5_32.

[25] **Fiaschi L.** and Cococcioni M. Numerical Asymptotic Results in Game Theory Using Sergeyev's Infinity Computing. *International Journal of Unconventional Computing*, 14(1):1–25, 2018.