

LORENZO FIASCHI

Born: 16/01/1995

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ACADEMICS

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| Postdoctoral researcher , Department of Information Engineering, University of Pisa | 2022 - now |
| Ph.D. of Information Engineering (Honors) , University of Pisa | 2019 - 2022 |
| 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 |

TEACHING EXPERIENCE

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| Assistant Lecturer Reinforcement Learning - Master of Information Engineering - 20 hours - 50 students | Spring 2020 - now <i>University of Pisa</i> |
| Assistant Lecturer Elements of Programming - Bachelor of Information Engineering - 20 hours - 250 students | Fall 2019 - now <i>University of Pisa</i> |

AWARDS

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| Winner of 1-year mentorship on start-up creation - Funded by University of Modena and Reggio Emilia | 2024 |
| Winner of 3,000€ grant for Ph.D. students mobility abroad - Funded by University of Pisa | 2022 |
| Winner of 5,000€ grant for international workshop organization¹ - Funded by University of Pisa | 2020 |
| Winner of the “Springer Young Researcher Prize”² - Funded by Springer Publisher | 2019 |
| Winner of the “Francesca Paola Nicotra” scholarship³ - Funded by Nicotra’s family | 2009 |

EUROPEAN PROJECTS PARTICIPATION

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| FAIR - Future Artificial Intelligence Research Spoke: 1 - Human-centered AI; Program: PNRR WP: 2.3 - Exploiting Non-Standard Analysis to Empower Deep Neural Networks and Reinforcement Learning | 2023 - now |
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| TEXTAROSSA Program: Horizon 2020 Topic: Mixed precision algorithms for HPC applications of optimization and machine learning | 2022 - 2023 |
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SERVICE TO THE RESEARCH COMMUNITY

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| Keynote lecturer ICORES24: Lexicographic Multi-Objective Optimization Using Infinite, Finite and Infinitesimal Numbers | 2024 |
| Organizer of the following conferences 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 |
| Peer reviewer for the following (selected) journals Transactions on Evolutionary Computation Journal of Computational and Applied Mathematics Remote Sensing | |

¹ Title: “Hardware accelerators for Deep Neural Networks and Machine Learning”.

² 500€ grant.

³ 3,000€ grant, ex-equo.

Journal of Marine Science and Engineering
Computers and Operations Research
Electronics
Applied sciences

Peer reviewer for the following books

Numerical infinities and infinitesimals

Thesis supervisor for the following programs

Master of Artificial Intelligence and Data Engineering, Pisa, Italy

2 theses

INTERNSHIPS AND OTHER ACTIVITIES

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| Seminar on machine learning for non-linear dynamics inference, University of Genoa | 2019 |
| Heart attacks and dementia prediction with machine learning, University of Genoa | 2018 |

TECHNICAL SKILLS

Languages, Scripts, and Technologies: C++, Python, Pytorch, Julia, Matlab

SDK's and Frameworks: CLion, Visual Studio, Jupiter

Text Editors and now ations: LaTeX, Microsoft Word, Microsoft Powerpoint

Repository Management: GitHub

Operating Systems: Windows, Linux Distributions (Debian, Ubuntu, Mint)

LANGUAGE SKILLS

Italian: mothertongue

English: C1

VOLUNTEERING

Co-founder and secretary of a non-profit basketball association 2019 - now

Organizing championships, tournaments, and events in Tuscany and Italy with hundreds of participants each

Duties: Planning of the events, Interface with the sponsor and public administration, Responsible for the IT infrastructure, Manager of the personnel, Coordinator in situ

PUBLICATIONS

- [1] **Fiaschi L.** and Cococcioni M. Informed deep hierarchical classification: a non-standard analysis inspired approach. *arXiv*, 2025.
- [2] 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.
- [3] 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.
- [4] **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.
- [5] 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.
- [6] 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.
- [7] Cococcioni M., **Fiaschi L.**, and Lambertini L. On impure prisoners' dilemmas, folk theorems, and correlation devices. In *EARIE 2022 (VIENNA)*, 2022. to appear.

- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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.
- [12] 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.
- [13] 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.
- [14] 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.
- [15] 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.
- [16] 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.
- [17] **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.
- [18] **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.
- [19] **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.

REFERENCES

Marco Cococcioni, marco.cococcioni@unipi.it, m.cococcioni@gmail.com, Ph.D. Tutor
Vieri Benci, vieri.benci@unipi.it, vieri.benci@gmail.com, Non-Standard Analysis Advisor
Kalyanmoi Deb, kdeb@egr.msu.edu, evolutionary optimization co-author
Luca Lambertini, luca.lambertini@unibo.it, game theory co-author