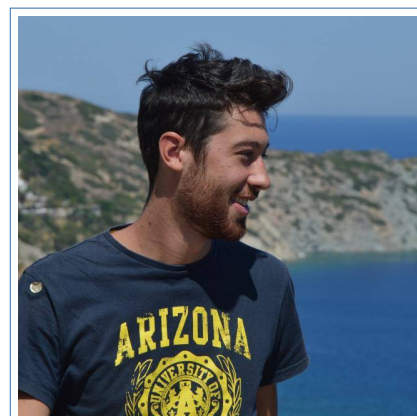


Lorenzo Fiaschi

Ph.D. Student



Personal Data

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Education

2019–present **Ph.D. in Information Engineering**, *University of Pisa*, Pisa, Italy.
2017–2019 **Master's Degree in Computer Science and Engineering**, *University of Genoa*, Genoa, Italy.
Thesis Title: Non-Archimedean Game Theory, a Numerical Approach (Supervisor: Marco Cococcioni, Alessandro Verri)
Mark - 110 cum Laude | Average Weighted Mark - 32.09 | Major: Machine Learning | Minors: Game Theory & Non-Standard Analysis
2014–2017 **Bachelor's Degree in Information Engineering**, *University of Pisa*, Pisa, Italy.
Thesis Title: Game Theory with Infinite or Infinitesimal Quantities: New Numerical Results (Supervisor: Marco Cococcioni)
Mark - 110 cum Laude | Average Weighted Mark - 28.73

Experience

Internships

- 2019 **Public Seminar**, *Machine Learning for non-linear dynamics inference and prediction*, Electronic Engineering Department, Genoa, Italy.

Description:

- sparse non-linear fields inference (potentially constrained)
- interpretable inference of a Koopman operator by means of autoencoders
- CNN and Pseduo-Huber loss for Dynamical Smoothing of non-linear stochastic fields
- Supervisor: Marco Storace

- 2018 **University Project**, *field: Computational Biology*, DIBRIS, Genoa, Italy.

Description:

- Collaboration with San Martino Hospital (GE)
- Exploitation of machine learning techniques (MKL) for prediction of heart attacks and dementia rising
- Data: genome,retina segmentation and common clinical information of 1000 people

Achievements:

- Design and implementation of the whole framework
- Improved prediction performances w.r.t. the literature

- 2017 **University Project**, *field: Non-Standard Game Theory*, Information Engineering Department, Pisa, Italy.

Description:

- Extension of Prisoner's Dilemma Tournaments to non-standard quantities
- Exploitation of the Grossone Methodology
- Numerical verification of the theoretical results in Matlab
- The study has been realized with the agreement of the University of Genoa

Achievements:

- Characterization of the solutions of a constrained infinite tournament, when they exist
- Numerical analysis of new and never studied tournament scenarios

Relevant Classes

Machine Learning Machine Learning, Inverse Problems, Computational Vision, Bioinformatics & Computational Biology, Graph Analytics

NSA Ultrafilters and Non-Standard Methods

HPC High Performance Computing

Game Theory Game Theory

Achievements (Scholarships, Fellowships and Awards)

- 2020 Winner of 5,000€ grant for “Hardware accelerators for Deep Neural Networks and Machine Learning” workshop organization, funded by University of Pisa within “Progetto Giovani” initiative
- 2019 Winner of a three-year doctoral fellowship at Dipartimento di Ingegneria dell’Informazione, University of Pisa, granted by the Italian Ministry of Education, University and Research
- 2019 Winner of the “Springer Young Researcher Prize”, for the best talk provided by a young researcher during the 3rd *International Conference on Numerical Computations: Theory and Algorithms* (NUMTA’19)
- 2009 Winner of the scholarship “Francesca Paola Nicotra”, ranking first out of all the first-three-years high school students of Piombino (LI), Italy

Attended Conferences (* if presenting a work)

- October 14th *International Conference on Game Theory and Management*
2020* (GTM2020), St. Petersburg, SPB, Russia
- June 2019* 3rd *International Conference on Numerical Computations: Theory and Algorithms* (NUMTA’19), Isola di Capo Rizzuto, KR, Italy

Attended Summer Schools and Seminars

- September 2019 Summer school on Applied Harmonic Analysis and Machine Learning, Department of Mathematics, Genoa, Italy
- December 2018 Seminar on “Weak Interactions”, taught by prof. Andreas Maurer, independent researcher, Genoa, Italy
- July 2018 2nd International Summer School on Deep Learning 2018, Genoa, Italy

Teaching

- 2019/2020 Assistant lecturer of Elements of Programming, Information Engineering Bachelor’s degree, 40h, 9 CFU, 300 students)
- 2019/2020 Assistant lecturer of Elements of Programming, Information Engineering Bachelor’s degree, 20h, 9 CFU, 150 students)

Service to the Research Community

Fiaschi has been program committee member of the following conferences:

- 6–9 IEEE Symposium on Computational Intelligence for Security and Defense
December 2019 Applications (IEEE CISDA), Xiamen, China

Fiaschi has served as organizer of the following conferences:

30 November 2020 PhD Workshop on Hardware accelerators for AI and HPC applications, Pisa, Italy

Language Skills

Italian mother tongue
English fluent: attending PhD program mainly in English (2019-), attending C1/C2-level IELTS proficiency course, C1-level CLI certification for academic English (2020), attended for two years master's classes taught in English (2017-2019), B2-level Cambridge Certification (2012)

Computer Skills

Programming Languages C and C++11 (advanced), Java (advanced), Julia (advanced), Python (advanced), SQL (fair)
Parallel Paradigms OpenMP (advanced), MPI(advanced), OpenCL (basic)
Math Packages Matlab (fair), R (basic)
Typesetting Packages Latex (advanced), Microsoft Word (advanced), Microsoft PowerPoint (advanced)
Development tools Visual Studio Code (advanced), Anaconda (advanced)
Database MySQL (fair)

Publications

- [1] Cococcioni M., Fiaschi L., and Lambertini L. Non-archimedean zero-sum games. *Journal of Computational and Applied Mathematics*, 2021, doi:10.1016/j.cam.2021.113483.
- [2] Lai L., L. Fiaschi, M. Cococcioni, and Deb K. Handling priority levels in mixedpareto-lexicographic many-objectiveoptimization problems. *11th Edition of International Conference Series on Evolutionary Multi-Criterion Optimization (EMO2021)*, 2020.
- [3] M. Cococcioni and L. Fiaschi. The big-M method with the numerical infinite M . *Optimization Letters*, 2020, doi:10.1007/s11590-020-01644-6.
- [4] L. Lai, L. Fiaschi, and M. Cococcioni. Solving mixed pareto-lexicographic multi-objective optimization problems: The case of priority chains. *Swarm and Evolutionary Computation*, page 100687, 2020.
- [5] L. Fiaschi and M. Cococcioni. Non-Archimedean Game Theory. *Applied Mathematics and Computation*, 2020, doi:10.1016/j.amc.2020.125356.

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