

Curriculum Vitae of Alessandro Lonardi

-  Full name (pronouns): Alessandro Lonardi (he/him/his)
-  Employment: Research Intern
-  Address: Avda. del Portal de l'Àngel, 40, Ciutat Vella, 08002 Barcelona, Spain
-  E-Mail: [alessandro.lonardi.vr \[at\] gmail.com](mailto:alessandro.lonardi.vr@gmail.com)
-  Personal website: aleable.github.io

Research experience

Jul, 2024 – Dec, 2024

Research Intern at Sony AI, Barcelona, Spain

Jan, 2024 – Aug, 2024

Guest Researcher at the Max Planck Institute for Intelligent Systems, Tübingen, Germany

Sep, 2020 – Dec, 2023

PhD Student at the Max Planck Institute for Intelligent Systems, Tübingen, Germany

Mar, 2020 – Aug, 2020

Research Intern at the Max Planck Institute for Intelligent Systems, Tübingen, Germany

Education

Sep, 2020 – Apr, 2024

PhD in Computer Science at the Max Planck Institute for Intelligent Systems, Tübingen, Germany (magna cum laude)

Thesis: Designing Networks with Adaptation Rules and Optimal Transport

Supervisor: Caterina De Bacco

Program: International Max Planck Research School for Intelligent Systems (IMPRS-IS)

Oct, 2018 – Jul, 2020

Master's Degree in Mathematical Engineering at the University of Padova, Italy (cum laude)

Thesis: Developing new methods for routing and optimal transport on networks

Supervisors: Mario Putti, Caterina De Bacco

Program: Mathematical Modelling for Engineering and Science

Oct, 2015 – Sep, 2018

Bachelor's Degree in Physics at the University of Padova, Italy

Thesis: Dynamics and thermodynamics of the adiabatic piston (in Italian)

Supervisor: Giancarlo Benettin

Additional work experience

Oct, 2022 – Apr, 2023

Head, co-founder at Commute, Germany

Advancement: Our startup was dedicated to providing data-driven solutions to policymakers to build transportation infrastructures for better livability in cities. It was admitted to the initial phase of the MAXImize incubation program (maximize-incubator.com) for the Max Planck Society, supported by Max Planck Innovation GmbH

Talks

Each category is in reverse chronological order.

Invited talks

- [IT1] Bilevel optimization for flow control in optimal transport networks
Research Seminar on Mathematical Optimization (Saarland University, Germany, 2024) | [Slides](#)

Contributed talks

- [CT3] Bilevel optimization for flow control in optimal transport networks
Netsci 2023 (Vienna, Austria, 2023) | [Abstract](#) | [Slides](#)
- [CT2] Infrastructure adaptation and emergence of loops in network routing with time-dependent loads
Netsci 2023 Satellite, Networks & cities (Vienna, Austria, 2023) | [Abstract](#) | [Slides](#)
- [CT1] Optimal transport in networks for design and flux optimization
NetPLACE Seminars (online, 2023) | [Slides](#) | [Video](#)

Teaching experience

Oct, 2021 – Feb, 2022

Teaching assistant of Advanced Probabilistic Machine Learning and Applications, University of Tübingen, Tübingen, Germany

Lecturer: Caterina De Bacco

Apr, 2021 – July, 2021

Teaching assistant of Advanced Probabilistic Machine Learning and Applications, University of Tübingen, Tübingen, Germany

Lecturer: Caterina De Bacco

Academic service

Peer-review (number of reviews)

Physical Review E (1), Physical Review Research (1), Scientific Reports (1), Journal of Physics Communications (3), Physica Scripta (2), SysDo 2024 (1)

Skills

Advanced IT skills (> 6 years)

Python (libraries for ML, scientific computing, data science, data visualization), Linux: Debian-based distributions, macOS, \LaTeX , code parallelization on computing infrastructures, git, developer productivity tools

Intermediate-beginner IT skills

C++, Mathematica, MATLAB, HTML, CSS, Linux: Arch-based distributions

Languages

English (full proficiency), Italian (native), German (independent user), Spanish (basic user)

Extracurricular activities

May 28, 2024 University orientation for high schoolers: Career perspectives in AI (calabreselevi.edu.it)

July 30 – 31, 2022 Volunteer for TReND in Africa Python Workshop 2022 (trendinafrica.org)

2016 – 2017 Volunteer for Pint of Science Italia (pintofscience.it)

Publications

Each category is in reverse chronological order. Asterisks denote equal contribution.

Preprints

- [PP1] Cohesive urban bicycle infrastructure design through optimal transport routing in multilayer networks
[Alessandro Lonardi](#), Michael Szell, Caterina De Bacco
Under review in Journal of The Royal Society Interface | [arXiv](#) | [GitHub](#)

Journal Papers

- [JP7] Message-Passing on Hypergraphs: Detectability, Phase Transitions, and Higher-Order Information
Nicolò Ruggeri*, [Alessandro Lonardi*](#), Caterina De Bacco
[Journal of Statistical Physics: Theory and Experiment](#) (4), 043403 (2024) · [arXiv](#) | [GitHub](#) | [CO₂ compensation](#)
- [JP6] Bilevel Optimization for Traffic Mitigation in Optimal Transport Networks
[Alessandro Lonardi](#), Caterina De Bacco
[Physical Review Letters](#) 131, 267401 (2023) | [arXiv](#) | [GitHub](#)
- [JP5] Immiscible Color Flows in Optimal Transport Networks for Image Classification
[Alessandro Lonardi*](#), Diego Baptista*, Caterina De Bacco
[Frontiers in Physics](#) 11:1089114 (2023) | [arXiv](#) | [GitHub](#) | [Poster](#) | [CO₂ compensation](#)
- [JP4] Infrastructure adaptation and emergence of loops in network routing with time-dependent loads
[Alessandro Lonardi](#), Enrico Facca, Mario Putti, Caterina De Bacco
[Physical Review E](#) 107, 024302 (2023) | [arXiv](#) | [GitHub](#)
- [JP3] Multicommodity routing optimization for engineering networks
[Alessandro Lonardi](#), Mario Putti, Caterina De Bacco
[Scientific Reports](#) 12, 7474 (2022) · [arXiv](#) | [GitHub](#)
- [JP2] Optimal Transport in Multilayer Networks for Traffic Flow Optimization
Abdullahi Adinoyi Ibrahim, [Alessandro Lonardi](#), Caterina De Bacco
[Algorithms](#), 14(7), 189 (2021) | [arXiv](#) | [GitHub](#)
- [JP1] Designing optimal networks for multicommodity transport problem
[Alessandro Lonardi](#), Enrico Facca, Mario Putti, Caterina De Bacco
[Physical Review Research](#) 3, 043010 (2021) · [arXiv](#) | [GitHub](#)

Last updated August 29, 2024.