

Curriculum Vitae of Alessandro Lonardi

Personal data

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

Research experience

Jul 1, 2024 – Dec 31, 2024

Research Intern at Sony AI, Barcelona, Spain

Jan 1, 2024 – Aug 31, 2024

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

Sep 1, 2020 – Dec 31, 2023

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

Mar 1, 2020 – Aug 31, 2020

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

Education

Sep 1, 2020 – Apr 26, 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 1, 2018 – Jul 23, 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

Supervisor: Mario Putti

Co-supervisor: Caterina De Bacco

Curriculum: Mathematical Modelling for Engineering and Science

Oct 1, 2015 – Sep 24, 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 MAX!mize 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
[Alessandro Lonardi](#)
[Research Seminar on Mathematical Optimization](#) (online, Saarland University, Germany, 2024) · [Slides](#)

Contributed talks

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

Teaching experience

Oct 21, 2021 – Feb 11, 2022

Teaching assistant of Advanced Probabilistic Machine Learning and Applications, University of Tübingen, Tübingen, Germany
Lecturer: Caterina De Bacco

Apr 19, 2021 – July 31, 2021

Teaching assistant of Advanced Probabilistic Machine Learning and Applications, University of Tübingen, Tübingen, Germany
Lecturer: Caterina De Bacco

Academic service

Peer-review (# of reviews)

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

Languages

English (full proficiency)
Italian (native)
German (independent user) ~ B1/B2 (CEFR)
Spanish (basic user) ~A1/A2 (CEFR)

IT skills

Advanced level (> 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 level

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

Extracurricular activities

May 28, 2024

University orientation for high schoolers: Career perspectives in AI, Verona, Italy (calabreselevi.edu.it)

July 30 – 31, 2022

Volunteer for TRenD in Africa Python Workshop 2022, online (trendinafrica.org)

2016 – 2017

Volunteer for Pint of Science Italia, Padua, Italy (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](#)
[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](#)

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