

Fabrizio Boninsegna

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Personal Details

Nationality: Italian

Education

Ph.D. in Information Engineering

University of Padova

2022 – present

Supervisor: Francesco Silvestri *Co-supervisor:* Martin Aumüller

Topic: Algorithms for Differential Privacy and Mobility (in collaboration with Motion Analytica Srl)

Master's Degree in Physics

University of Padova, 110/110 cum laude, (weighted Average: 29.25/30)

2019 – 2022

Thesis: *Problems of Ranking and Dynamics of Complex Bipartite Networks in Economic Complexity*

Supervisor: Fulvio Baldovin; *Co-supervisors:* Attilio L. Stella, Gianluca Teza

Main Courses: Statistical Physics, Complex Systems, Many Body Quantum Theory.

Bachelor's Degree in Physics

University of Padova, 105/110, (weighted average: 27.15/30)

2016 – 2019

Thesis: *Solitons in Classical and Quantum Fluids*

Supervisor: Luca Salasnich

International Experience

IT University of Copenhagen - University of Copenhagen (BARC)

Visiting Researcher

2024

Conducted research on Differential Private Algorithms with Prof. Martin Aumüller and the Providentia group at Basic Research Algorithm Copenhagen (BARC). Focused on Locality Sensitive Filters for Differential Private Approximate Range Queries and Quantile Estimation with Local Differential Privacy.

Ruprecht Karl University of Heidelberg, Germany

Erasmus Exchange Program (winter semester)

2020 – 2021

Completed coursework in Monte Carlo Simulations, Many-Body Quantum Physics, and Quantum Information.

Grants and Scholarships

Ing. Aldo Gini Foundation Scholarship

2024

The scholarship covered part of the expenses for my visiting research period in Copenhagen.

Oblivious, Oxford Differential Privacy Bootcamp

2024

I was invited for a one-week bootcamp in differential privacy by Oblivious in Oxford.

Theory and Practice of Differential Privacy (TPDP)

2025

I received student travel support to participate at TPDP in Mountain View, Google.

Work Experience

Academic Roles.....

University of Padova

Physics Tutor

2020

Delivered online tutoring sessions for Bachelor students in Biology during the COVID-19 pandemic.

University of Padova

Librarian (Part-Time)

2019

Assisted with library operations as part of a 200-hour student work program.

Private Sector Roles.....

Motion Analytical Srl

Ph.D. Student Researcher

2022 - present

Conducted research on mobility data, privacy, and smart mobility.

Giardini dell'Arena / Parco della Musica, Padova

Bartender

2021 – 2022

Part-time bartender for events including concerts; full-time from April 2022.

Primiero San Martino di Castrozza

Waiter

2016 – 2020

Seasonal work during summer and winter at a four-star hotel.

Skills

Programming Languages.....

Python



High proficiency with libraries for data science (numpy, pandas, matplotlib, etc.), geo-spatial analysis (geopandas, shapely), deep learning (PyTorch), and differential privacy (OpenDP).

Rust



Lower-intermediate level; developed a project on similarity search in high-dimensional spaces using Rust.

C++



First programming language I learned during University in Physics.

Languages.....

English



Full professional proficiency demonstrated through academic and research activities.

Soft Skills.....

Adaptability

Proven ability to excel across diverse academic disciplines, effortlessly transitioning between Physics and Computer Science while adapting to international and interdisciplinary research environments.

Personal Interests

Music:

- Play bass guitar (5 years of jazz training during high school), guitar, piano, and synthesizer.

- Interested in music production using digital audio workstations such as Logic Pro X and Ableton Live.
- Published a self-produced album titled *L'assenzio* with my former progressive rock band *Elettroliti*.

Mountain:

- Passionate about sport climbing and hiking, regularly engaging in outdoor activities.
- I assist The South Adventure in guiding young enthusiasts of mountain hiking on their excursions.

List of Publications

- [1] Anders Aamand, Fabrizio Boninsegna, Abigail Gentle, Jacob Imola, and Rasmus Pagh. *Lightweight Protocols for Distributed Private Quantile Estimation*. Spotlight paper at International Conference on Machine Learning (ICML). 2025. arXiv: 2502.02990 [cs.CR]. URL: <https://arxiv.org/abs/2502.02990>.
- [2] Fabrizio Boninsegna and Francesco Silvestri. *Differentially Private Release of Hierarchical Origin/Destination Data with a TopDown Approach*. Proc. 25th Privacy Enhancing Technologies Symposium (PETS). 2025. arXiv: 2412.09256 [cs.DS]. URL: <https://arxiv.org/abs/2412.09256>.
- [3] Martin Aumüller, Fabrizio Boninsegna, and Francesco Silvestri. *A Simple Linear Space Data Structure for ANN with Application in Differential Privacy*. Proc. of 6th annual Symposium on Foundations of Responsible Computing (FORC). 2024. arXiv: 2409.07187 [cs.DS]. URL: <https://arxiv.org/abs/2409.07187>.
- [4] Jacob Imola, Fabrizio Boninsegna, Hannah Keller, Anders Aamand, Amrita Roy Chowdhury, and Rasmus Pagh. *Differentially Private Quantiles with Smaller Error*. 2025. arXiv: 2505.13662 [cs.DS]. URL: <https://arxiv.org/abs/2505.13662>.
- [5] Fabrizio Boninsegna. *InfTDA: A Simple TopDown Mechanism for Hierarchical Differentially Private Counting Queries*. Workshop on Theory and Practice of Differential Privacy (TPDP) 2025. 2025. arXiv: 2505.05347 [cs.DS]. URL: <https://arxiv.org/abs/2505.05347>.
- [6] Fabrizio Boninsegna. "Locality Sensitive Hashing of Trajectories Under Local Differential Privacy". In: *Proceedings of the 31st Symposium of Advanced Database Systems, Galzingano Terme, Italy, July 2nd to 5th, 2023*. Ed. by Diego Calvanese, Claudia Diamantini, Guglielmo Faggioli, Nicola Ferro, Stefano Marchesin, Gianmaria Silvello, and Letizia Tanca. Vol. 3478. CEUR Workshop Proceedings. CEUR-WS.org, 2023, pp. 681–687. URL: <https://ceur-ws.org/Vol-3478/paper56.pdf>.