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) 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.	

2016 - 2019

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

	Jages		
Python		High proficiency with libraries for data science (numpy, pandas, matplotlib, etc.), geo-spatial anal- ysis (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 aca- demic 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] 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.
- [5] 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://ceurws.org/Vol-3478/paper56.pdf.