Lorenzo Beretta

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RESEARCH INTERESTS

My research focuses on designing and analyzing efficient algorithms for problems arising in data science. I am particularly interested in sublinear algorithms and high-dimensional geometric problems.

EMPLOYMENT

PostDoc at University of California, Santa Cruz Sep 2024 – Sep 2025
Host: Vaggos Chatziafratis.
Goldstine Fellow at IBM, Cambridge Sep 2025 – Sep 2026
Host: Kenneth Clarkson.

EDUCATION

Ph.D. Basic Algorithm Research Copenhagen, University of Copenhagen Oct 2020 – Apr 2024
Supervisors: Mikkel Thorup & Mikkel Abrahamsen.
Scuola Normale Superiore (Honors Program)
During my 5-year B.S. and M.S, I took an additional 2-year workload of math and physics courses as part of this honors program.
M.S. Computer Science, University of Pisa Sep 2018 – Oct 2020
Grade 110/110 cum Laude.
B.S. Mathematics, University of Pisa Sep 2015 – Oct 2018
Grade 110/110 cum Laude.

AWARDS

Goldstine Postdoctoral Fellowship at IBM
SODA Best Student Paper Award
The paper "Better Sum Estimation via Weighted Sampling" was awarded a best student paper award at SODA 2022, it was invited to HALG 2022 and TALG special issue.
EU TALENT Doctoral Fellowship Grant
I was granted a PhD fellowship by the Horizon 2020 Marie Skłodowska-Curie program (grant n. 801199).
Scuola Normale Superiore: Undergraduate Honors Program
I was admitted to Scuola Normale Superiore and Scuola Superiore Sant'Anna. Both programs are the top programs in Italy for math and engineering respectively and each admits about 15 students per year.

PUBLISHED PAPERS

1. **Approximating High-Dimensional Earth Mover's Distance as Fast as Closest Pair**
   Lorenzo Beretta, Vincent Cohen-Addad, Rajesh Jayaram, Erik Waingarten
   in **FOCS 2025** *(Symposium on Foundations of Computer Science).*

2. **New Statistical and Computational Results for Learning Junta Distributions**
   Lorenzo Beretta
   in **RANDOM 2025** *(International Conference on Randomization and Computation).*

3. **Sketched Lanczos uncertainty score: a low-memory summary of the Fisher information**
   Marco Miani, Lorenzo Beretta, Søren Hauberg
   in **NeurIPS 2024** *(Advances in Neural Information Processing Systems).*

4. **Online sorting and online TSP: randomized, stochastic, and high-dimensional**
   Mikkel Abrahamsen, Ioana Bercea, Lorenzo Beretta, Jonas Klausen and László Kozma
   in **ESA 2024** *(European Symposium on Algorithms)*. Presented at **HALG 2025**.
5. **Approximate Earth Mover's Distance in Truly-Subquadratic Time**
   Lorenzo Beretta, Aviad Rubinstein
   in **STOC 2024** *(Symposium on Theory of Computing)*
6. **Multi-Swap k-Means++**
   Lorenzo Beretta, Vincent Cohen-Addad, Silvio Lattanzi, Nikos Parotsidis
   in **NeurIPS 2023** *(Advances in Neural Information Processing Systems)*
7. **Locally Uniform Hashing**
   Ioana Bercea, Lorenzo Beretta, Jonas Klausen, Jakob Bæk Tejs Houen, Mikkel Thorup
   in **FOCS 2023** *(Symposium on Foundations of Computer Science)*
8. **Online Sorting and Translational Packing of Convex Polygons**
   Anders Aamand, Mikkel Abrahamsen, Lorenzo Beretta, Linda Kleist
   in **SODA 2023** *(Symposium on Discrete Algorithms)*
9. **Better Sum Estimation via Weighted Sampling**
   Lorenzo Beretta, Jakub Tetek
   in **SODA 2022** *(Symposium on Discrete Algorithms)* and **TALG** *(Transactions on Algorithms)*
   Best Student Paper Award
   Invited to HALG 2022 and TALG special issue
10. **Online Packing to Minimize Area or Perimeter**
    Mikkel Abrahamsen, Lorenzo Beretta
    in **SoCG 2021** *(International Symposium on Computational Geometry)*
11. **An Optimal Algorithm to Find Champions of Tournament Graphs**
    Lorenzo Beretta, Franco Maria Nardini, Roberto Trani, Rossano Venturini
    in **TKDE** *(IEEE Transactions on Knowledge and Data Engineering)*

WORK IN PROGRESS

The following manuscripts are in preparation.

- **Tight Bounds on Testing Juntas with Samples**
  Lorenzo Beretta, Caleb Koch, Nathaniel Harms
- **Subquadratic Earth Mover's Distance via Offline Nearest Neighbor**
  Lorenzo Beretta, Vincent Cohen-Addad, Rajesh Jayaram, Erik Waingarten

INTERNSHIPS

Stanford University Feb 2023 – Aug 2023
I worked with Aviad Rubinstein on sublinear-time matching algorithms.
Google Research Oct 2022 – Dec 2022
I worked on designing, analyzing and implementing clustering algorithms.
Quantitative Investment Internship, Société Générale Aug 2019 – Oct 2019
I worked on implementing efficient algorithms for "optimal intraday execution".

ACADEMIC SERVICE

Conference Review
ESA (2022, 2023, 2024), ITCS (2024), SOSA (2024), FOCS (2023), SWAT(2024), STOC (2025) ICALP (2025) ISAAC (2024) NeurIPS (2025)
Journal Review
Journal of Computational Geometry (JoCG)

TEACHING AND LEADERSHIP

Teaching Assistant, Copenhagen University 2021 – 2022
I served as a T.A. in the "Randomized Algorithm" graduate course at Copenhagen University for two quarters.
Scout Leader Volunteer Sep 2017 – Aug 2020
I volunteered as a Scout leader, managing a troop of about 30 teenagers.
High School Teacher Sep 2017 – May 2018
I served as a support teacher at a local high school in Pisa.

COMPETITIONS

ACM ICPC Programming Contest: South-Western Europe Regional Contest 2018
Representing Scuola Normale Superiore, Bronze Medal, 10th place.
National Mathematics and Physics Olympiads 2015
Silver medal in Mathematics and Bronze medal in Physics.