Lorenzo Beretta

IBM Research, Cambridge, MA

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Research Interests

High-dimensional geometry, high-dimensional probability, sublinear algorithms, property testing, optimal transport.

Education

- **Ph.D. in Computer Science University of Copenhagen** Oct 2020 – Apr 2024
  Advised by Mikkel Thorup & Mikkel Abrahamsen
- **Scuola Normale Superiore (Honors Program)** 2015 – 2020
  During my B.S. and M.S, I took an additional 2-year workload of math and physics courses
- **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

Appointments

- **Goldstine Fellow at IBM, Cambridge, MA** Sep 2025 – present
  Hosted by Kenneth Clarkson
- **Postdoc at University of California, Santa Cruz** Sep 2024 – Sep 2025
  Hosted by Vaggos Chatziafratis

Awards

- **Herman Goldstine Postdoctoral Fellowship at IBM** 2025
- **Best Student Paper Award, SODA 2022** 2022
  for "Better Sum Estimation via Weighted Sampling", also invited to ***HALG 2022*** *and* ***TALG special issue***
- **EU TALENT Doctoral Fellowship Grant** 2020
  I was granted a PhD fellowship by the Horizon 2020 Marie Skłodowska-Curie program (grant n. 801199)
- **Undergraduate Honors Program: Scuola Normale Superiore** 2015
  I was admitted to Scuola Normale Superiore, top math program in Italy (≈ 15 students admitted per year)

Publications

Peer Reviewed Conference Proceedings

Faster Estimation of the Average Degree of a Graph Using Random Edges and Structural Queries
with Deeparnab Chakrabarty, C. Seshadhri
Symposium on Discrete Algorithms (SODA), 2026 C12

Feature Selection and Junta Testing are Statistically Equivalent
with Nathaniel Harms, Caleb Koch
Symposium on Discrete Algorithms (SODA), 2026 C11

Approximating High-Dimensional Earth Mover's Distance as Fast as Closest Pair
with Vincent Cohen-Addad, Rajesh Jayaram, Erik Waingarten
Symposium on Foundations of Computer Science (FOCS), 2025 C10

New Statistical and Computational Results for Learning Junta Distributions
International Conference on Randomization and Computation (RANDOM), 2025 C9

Sketched Lanczos uncertainty score: a low-memory summary of the Fisher information
with Marco Miani, Søren Hauberg
Advances in Neural Information Processing Systems (NeurIPS), 2024 C8

Online sorting and online TSP: randomized, stochastic, and high-dimensional
with Mikkel Abrahamsen, Ioana Bercea, Jonas Klausen and László Kozma
European Symposium on Algorithms (ESA), 2024 C7

Approximate Earth Mover's Distance in Truly-Subquadratic Time
with Aviad Rubinstein
Symposium on Theory of Computing (STOC), 2024 C6

Multi-Swap k-Means++
with Vincent Cohen-Addad, Silvio Lattanzi, Nikos Parotsidis
Advances in Neural Information Processing Systems (NeurIPS), 2023 C5

Locally Uniform Hashing
with Ioana Bercea, Jonas Klausen, Jakob Bæk Tejs Houen, Mikkel Thorup
Symposium on Foundations of Computer Science (FOCS), 2023 C4

Online Sorting and Translational Packing of Convex Polygons
with Anders Aamand, Mikkel Abrahamsen, Linda Kleist
Symposium on Discrete Algorithms (SODA), 2023 C3

Better Sum Estimation via Weighted Sampling
with Jakub Tetek
Symposium on Discrete Algorithms (SODA), 2022
Best Student Paper Award, invited to HALG 2022 and TALG special issue C2

Online Packing to Minimize Area or Perimeter
with Mikkel Abrahamsen
International Symposium on Computational Geometry (SoCG), 2021 C1

Journal Publications

Better Sum Estimation via Weighted Sampling
with Jakub Tetek
Transactions on Algorithms (TALG) J2

An Optimal Algorithm to Find Champions of Tournament Graphs
with Franco Maria Nardini, Roberto Trani, Rossano Venturini
IEEE Transactions on Knowledge and Data Engineering (TKDE) J1

Academic Service

- **Conference Review**

  ESA (2022, 2023, 2024), FOCS (2023), ICALP (2025), ISAAC (2024), ITCS (2024), NeurIPS (2025), SODA (2026), SOSA (2024), STOC (2025), SWAT(2024)

- **Journal Review**

  Journal of Computational Geometry (JoCG)

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 execution.

Teaching and Leadership

- **Teaching Assistant, Copenhagen University** 2021 – 2022
  I served twice as T.A. for the "Randomized Algorithm" graduate course at Copenhagen University
- **Scout Leader Volunteer** 2017 – 2020
  I volunteered as a Scout leader, managing a troop of about 30 teenagers