

Tomer Shoham

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RESEARCH INTEREST

My research lies at the intersection of *differential privacy* and *statistics*, focusing on adapting classical statistical procedures to the constraints of differential privacy. This includes developing private methods for non-parametric confidence intervals based on resampling procedures, ratio estimation (odds ratio, relative risk) with associated confidence intervals, and CDF estimation.

A current direction of my work is understanding the statistical and privacy properties of sampling-based procedures such as subsampling and bootstrapping. I am particularly interested in quantifying privacy amplification induced by sampling and identifying regimes where sampling provides substantially more privacy than commonly assumed.

EDUCATION

- 2022– **PhD** • Computer Science, HUJI, advised by Prof. Katrina Ligett and Prof. Yosef Rinott
- 2018–2021 **MSc (magna cum laude)** • Statistics, with specialization in the study of rationality, HUJI, advised by Prof. Yosef Rinott
- 2015–2018 **BSc (magna cum laude)** • Economics & Statistics, HUJI

EMPLOYMENT

- 2019– **Research Assistant to Prof. Gil Kalai** • HUJI
Studying the statistical aspects of quantum supremacy experiments
- 2019–2023 **Research Assistant, Statistical Consulting Lab** • HUJI
Interdisciplinary applied research with Maccabi Healthcare Services and Hadassah Medical Center, examining environmental exposures and fetal growth.
- 2017–2020 **Data Analyst and Project Lead** • Israeli Ministry of Finance
Statistical analysis of HR and wage data; led data analysis projects.

TEACHING

- 2023– **Applied Data Privacy (HUJI)** • Co-developer and Instructor
Designed and taught an interactive, hands-on course; developing an online version.
- 2021– **Foundations of Data Privacy (HUJI)** • Co-developer and Teaching Assistant
Developed course materials, wrote exercises, taught tutorials, and graded coursework.
- 2022–2023 **Statistics for Data Science (HUJI)** • Teaching Assistant (recitation instructor)
- 2023–2024 **Networks, Crowds, and Markets (HUJI)** • Teaching Assistant (recitation instructor)

AWARDS

- CIDR Scholarship (2020–2022)
- Outstanding Student Award, Department of Statistics (2018–2020)
- Outstanding Student Award, Faculty of Social Sciences (2018–2019)

PROFESSIONAL MEMBERSHIP

- Member in the Federmann Center for the Study of Rationality
- Former member in the Center for Interdisciplinary Data Science Research (CIDR)

MILITARY SERVICE

- 2012–2015 **SIGINT Systems Technician** • Unit 8200, Israeli Intelligence Corps
Worked on LAN protocols, satellite communications, IT, and RF systems.

PAPERS

Journal papers

- [1] Ronit Nirel, Tomer Shoham, Ran Rotem, Wiessam Abu Ahmad, Gideon Koren, Itai Kloog, Rachel Golan, and Hagai Levine. *Maternal exposure to particulate matter early in pregnancy and congenital anomalies in offspring: Analysis of concentration-response relationships in a population-based cohort with follow-up throughout childhood*. In: *Science of The Total Environment* 880 (2023), p. 163082.
- [2] Yosef Rinott, Tomer Shoham, and Gil Kalai. *Statistical aspects of the quantum supremacy demonstration*. In: *Statistical Science* 37.3 (2022), pp. 322–347.

Conference papers

- [3] Tomer Shoham and Yosef Rinott. *Asking the proper question: Adjusting queries to statistical procedures under differential privacy*. In: *International Conference on Privacy in Statistical Databases*. Springer. 2022, pp. 46–61.

Preprints

- [4] Tomer Shoham and Katrina Ligett. *Differentially private ratio statistics*. In: *arXiv preprint arXiv:2505.20351* (2025).
- [5] Tomer Shoham, Moshe Shenfeld, Noa Velner-Harris, and Katrina Ligett. *Black-Box Differentially Private Nonparametric Confidence Intervals Under Minimal Assumptions*. In: *arXiv preprint arXiv:2511.01303* (2025).
- [6] Gil Kalai, Yosef Rinott, and Tomer Shoham. *Random Circuit Sampling: Fourier Expansion and Statistics*. In: *arXiv preprint arXiv:2404.00935* (2024).
- [7] Gil Kalai, Yosef Rinott, and Tomer Shoham. *Questions and Concerns About Google's Quantum Supremacy Claim*. In: *arXiv preprint arXiv:2305.01064* (2023).
- [8] Gil Kalai, Yosef Rinott, and Tomer Shoham. *Google's Quantum Supremacy Claim: Data, Documentation, and Discussion*. In: *arXiv preprint arXiv:2210.12753* (2022).