Noah Singer

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Education

2022– **Ph.D. in Computer Science**, *Carnegie Mellon University*, Computer Science Department, School of Computer Science, Pittsburgh, PA.
Supported by NSF GRFP fellowship.

2018–2022 **A.B. in Computer Science and Mathematics**, *Harvard University*, Harvard College, Cambridge, MA.
Magna cum laude with highest honors in field, GPA 3.97.

Research Interests

Broadly, complexity, cryptography, combinatorics, and algorithms, and applications of mathematical techniques towards answering questions in these areas.

Papers

Publications

[4] Noah Singer and Madhu Sudan. "Point-Hyperplane Incidence Geometry and the Log-Rank Conjecture". In: *ACM Transactions on Computation Theory* 14.2 (June 2022). Early version appeared in the National Collegiate Research Conference in January 2021.

[5] Noah Singer, Madhu Sudan, and Santhoshini Velusamy. "Streaming Approximation Resistance of Every Ordering CSP". In: *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques*. APPROX 2021 (Aug. 16–18, 2021). Ed. by Mary Wootters and Laura Sanità. Vol. 207. LIPIcs. Schloss Dagstuhl — Leibniz-Zentrum für Informatik, Sept. 2021, 17:1–17:19. DOI: 10.4230/LIPIcs.APPROX/RANDOM.2021.17.

Manuscripts

[1] Joanna Boyland, Michael Hwang, Tarun Prasad, Noah Singer, and Santhoshini Velusamy. "On Sketching Approximations for Symmetric Boolean CSPs". In submission. May 2022. arXiv: 2112.06319 [cs.DS].

[2] Raghuvansh R. Saxena, Noah Singer, Madhu Sudan, and Santhoshini Velusamy. "Streaming Complexity of CSPs with Randomly Ordered Constraints". In submission. Apr. 2022.

Thesis

[3] Noah Singer. "On Streaming Approximation Algorithms for Constraint Satisfaction Problems". BA thesis. Cambridge, MA: Harvard University, Mar. 2022. 140 pp. URL: https://nrs.harvard.edu/URN-3:HUL.INSTREPOS:37371750.

Awards

Spring 2022 **Hoopes Prize**.
Award from Harvard College for "outstanding scholarly work or research" on senior thesis [3].

Spring 2022 **NSF GRFP Fellowship**.

Spring 2022 **CRA Outstanding Undergraduate Researcher Award**, Honorable Mention.

Fall 2021 **Harvard College Research Program Grant**.

Spring 2021 **Phi Beta Kappa, Alpha Iota of Massachusetts**.
Elected in group of 24 juniors from the Harvard College Class of 2022.

2019–2021 **Certificate of Distinction in Teaching**.
Awarded by Harvard Office of Undergraduate Education on basis of instructor ratings in student evaluations. Overall scores were: CS 121 Fall 2019, 4.83/5; CS 121 Fall 2020, 4.88/5; CS 124 Spring 2021, 4.82/5.

Summer 2020 **Herchel-Smith Fellowship**.

Teaching

Graded and hosted office hours and recitation sections for the following courses in the Harvard CS department:

- *CS 121: Introduction to Theoretical Computer Science* (Fall 2021, Fall 2020, Fall 2019)
- *CS 124: Data Structures and Algorithms* (Spring 2021)
- *CS 161: Operating Systems* (Spring 2020)

In CS 121 and 124, organized advanced sections with weekly guest lectures.

Served as a teaching assistant for the *New Horizons in TCS* program at TTIC over Summer 2022.

Internships

Summer 2021 **Research Intern**, *DIMACS REU @ Rutgers University*, remote.
Worked with Prof. Eric Allender on complexity of circuit minimization and related problems. Supported by NSF grant CCF-1852215.

Summer 2020–Spring 2022 **Research Intern**, *Harvard University*, Cambridge, MA.
Worked with Prof. Madhu Sudan on communication and streaming complexity, supported by Herchel-Smith Fellowship and Harvard College Research Program.

Summer 2019 **Software Engineering Intern**, *Airbnb*, San Francisco, CA.
Built a production data pipeline to discover and manage large quantities of search advertising keywords targeting Airbnb hosts, efficiently scaling up listing creation due to search ads by over 20% and generating tens of thousands of dollars in weekly revenue.

Service

2020–2022 **Peer Concentration Adviser**, *Harvard University*, Department of Computer Science.

2020–2022 **WiCS Mentor**, *Harvard Women in Computer Science*.

Spring 2019 **Volunteer**, *Digital Literacy Project*.
Taught basic programming in Scratch and Processing.js to middle school students in Allston.

Skills

Programming languages: Python, Java, C/C++, JavaScript, x86 assembly, and OCaml. *Tools and frameworks:* LaTeX, Django, PyTorch, Mathematica, SQL, and Git.

Updated June 3, 2022.