

Sidhant Saraogi

Department of Computer Science, Georgetown University
sarsid.github.io

PRINCIPAL INTERESTS

Algorithms and Complexity.
Circuit Complexity, Analysis of Boolean Functions.

ACADEMIC BACKGROUND

Ph.D. Student in Computer Science. 2020-Present
Georgetown University, Washington, DC.
Advised by Professors Alexander Golovnev and Justin Thaler.

BMath in Computer Science and Combinatorics and Optimization. 2015-2020
University of Waterloo, Waterloo, Canada.

PUBLICATIONS & PREPRINTS

- Improved Lower Bounds for 3-Query Matching Vector Codes. Divesh Aggarwal, Pranjal Dutta, Zeyong Li, Maciej Obremski, and Sidhant Saraogi. ITCS 2025. Available at [ECCC](#).
- On the randomized complexity of range avoidance, with applications to cryptography and metacomplexity. Eldon Chung, Alexander Golovnev, Zeyong Li, Maciej Obremski, Sidhant Saraogi, Noah Stephens-Davidowitz. 2023. In Submission, Available at [ECCC](#).
- Range Avoidance for Constant-Depth Circuits: Hardness and Algorithms. Karthik Gajulapalli, Alexander Golovnev, Satyajeet Nagargoje, Sidhant Saraogi. RAN-DOM 2023.
- Pulse-level noisy quantum circuits with QuTiP. Boxi Li, Shahnawaz Ahmed, Sidhant Saraogi, Neill Lambert, Franco Nori, Alexander Pitchford, and Nathan Shammah. Quantum, 630 (2022).
- A Principled Approach to Defining Anonymization As Applied to EU Data Protection Law. Micah Altman, Aloni Cohen, Francesca Falzon, Evangelia Anna Markatou, Kobbi Nissim, Michel Jose Reymond, Sidhant Saraogi, Alexandra Wood. (2022). Available at <http://dx.doi.org/10.2139/ssrn.4104748>.

ONGOING PROJECTS

- Lower Bounds for Locally Decodable Codes.
- Lower Bounds for Low Depth Circuits.
- Lower Bounds for Communication Complexity.
- Algorithms for the Orthogonal Vectors Problem.

RESEARCH VISITS

Research Intern 2024
Cambridge University
Supervised by Professor Tom Gur.
Proved tight lower bounds for (relaxed) locally decodable codes.

Research Intern 2023
National University of Singapore
Supervised by Professor Divesh Aggarwal.

- Researched improved lower bounds for matching vector codes.
- Researched connections between cryptography, range avoidance and meta-complexity.

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| EMPLOYMENT HISTORY | Open Source Software Development | 2020 |
| | Google Summer of Code, QuTiP Software Package | |
| | <ul style="list-style-type: none"> Developed a classical simulation for quantum circuits module for the qutip-qip open source software package. Designed an qutip interpreter for the quantum assembly language standard (QASM) enabling better compatibility between different open source quantum simulation packages. | |
| | Research Assistant | 2019 |
| | Institute for Quantum Computing, Waterloo, Canada | |
| | Supervised by Professor David Gosset | |
| | <ul style="list-style-type: none"> Characterized the scope of the ideas developed in a paper by Gosset and Bravyi on the classical simulation of a family of stoquastic hamiltonians. | |
| | Research Intern | 2018 |
| | Bioinformatics Solutions Inc., Waterloo, Canada | |
| | <ul style="list-style-type: none"> Tasked with developing parts of a high throughput deep learning based immunopeptidomics pipeline. Worked on processing, statistical validation and deep learning based analysis of proteomic datasets to develop immunotherapy tools. | |
| AWARDS | Outstanding TA Award, Department of Computer Science, Georgetown University, | 2023-2024. |
| | GradGov-GSAS Research Grant, Georgetown University | Summer 2023 |
| | Second Place, Leader's Prize AI Competition. | 2020 |
| | Third Place, Citadel Data Open. | 2018 |
| | President's Research Award. | Fall 2017 |
| | President's Research Award. | Winter 2016 |
| | President's Scholarship of Distinction. | 2015 |
| | David Johnston International Student Entrance Scholarship. | 2015 |
| RESEARCH PRESENTATIONS | "Improved Lower Bounds for 3 query Matching Vector Codes", ITCS 2025, Fall 2024. | |
| | "Range-Avoidance for Constant-Depth Circuits", Harvard TGINF Seminar, Spring 2023. | |
| | "Fine Grained Cryptography for Circuits", Fine-grained Cryptography Workshop, FSTTCS 2022, Fall 2022. | |
| | "Survey of Lower Bounds for Constant Depth Circuits", Circuit Complexity Reading Group, Georgetown University, Fall 2022. | |
| | "Stabilizer Rank Bounds", Theory Open Mic, Georgetown University, Spring 2022. | |
| | "Polynomial-time classical simulation of quantum ferromagnets", IQC Student Seminar, Fall 2019. | |

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| WORKSHOPS | • Fine-Grained Complexity Workshop, Encore Insitute, UCSD | Spring 2025 |
| | • Synergies of Combinatorics and Theoretical Computer Science Summer School, EPFL | Fall 2024. |
| | • DIMACS Fine Grained Complexity Tutorial, Rutgers University | Summer 2024 |
| | • IAS/PCMI Graduate Summer School on Quantum Computing, Park City, Summer 2023 | |
| | • Summer School on High-dimensional Expanders, Ghent | Summer 2023 |
| TEACHING | TA and Guest Lecturer for Undergraduate Algorithms. | Fall 2024. |
| | Head TA and Guest Lecturer for Databases, Georgetown University. | Winter 2023, Fall 2023, Spring 2024. |
| | TA for Graduate Algorithms, Georgetown University. | Fall 2022 |
| SERVICE | • <i>Organizer</i> , Computer Science Theory Seminar, Georgetown University. 2022-now Invited speakers and coordinated logistics based on research interests of the Theory group. | |
| | • <i>Reviewer</i> , SICOMP and TOCT Journals. FOCS, STOC, RANDOM, CCC, SODA Conferences. | |
| | • <i>President</i> , <i>Georgetown Alliance of Graduate Employees</i> . Organized students as part of the graduate student union. | 2024 |
| | • <i>Organizer</i> , Unofficial UW Student Seminars, University of Waterloo. Developed and ran a weekly undergraduate mathematics seminar series exploring advanced topics in math/computer-science/physics. | 2016 |