Shubhang Kulkarni

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Education

University of Illinois, Urbana-Champaign 2020–(expected) May 2025
Ph.D. in Computer Science. (GPA: 3.93/4.00)
Advisor: Prof. Karthekeyan Chandrasekaran

Purdue University 2015 – 2019
B.S. in Computer Science (Highest Distinction), Mathematics Minor. (GPA: 3.96/4.00)

Research and Work Interests

Theoretical Computer Science: Combinatorial Optimization · Approximation Algorithms · Graph/Hypergraph Theory.
Operations Research: Mathematical Programming · Polyhedral Optimization · Numerical Linear Algebra.
Computer Science Applications: Software Engineering · Applied Mathematics · Data Science · Machine Intelligence.

Professional Experience

Apple Research and Software Engineering Intern May 2022 - August 2022
Privacy in Machine Learning Team

Argonne National Labs Research Intern May 2021 - August 2021
Mathematics and Computer Science Division

Microsoft Software Engineering Intern May 2018 - August 2018
Universal Store Core Commerce Dev Team

Montana State University Research and Software Engineering Intern May 2017 - August 2017
REU program

Tools

Programming Languages & Software: `Python, Java, C++, C#, Javascript, Gurobi, LLVM Polly`.
Libraries: `numpy, scipy, pytorch, isl, networkx, matplotlib, graphviz, pycrypto, d3.js`.

Professional Service

Teaching Assistant Positions (*Ranked Excellent by Students **Ranked Outstanding by Students ***TA Award)

Algorithms (Grad Class): CS473 UIUC [F24], CS580 Purdue [F19, S20]
Algorithms (Undergrad Class): CS374 UIUC [*S21, **F21], CS381 Purdue [S19, S18, ***F17]
Discrete Mathematics (Undergrad Class): CS173 UIUC
Data Structures (Undergrad Class): CS251 Purdue [S19]
Computer Architecture (Undergrad Class): CS250 Purdue [S17]

Conference Subreviewer:

ICALP '24, STOC '24, IPCO '24, STACS '24, ISAAC '23, ITCS '20, NeurIPS '19, CSR '19.

Journal Reviewer:

Algorithmica '24.

Publications

*co-first authored paper/manuscript. **first authored paper/manuscript.

1. (**AIED '23**) S. Poulsen, S. Kulkarni, G. Herman, and M. West. "Efficient feedback and partial credit grading for proof blocks problems." In *Artificial Intelligence in Education - 24th International Conference (AIED)* 2023. [link]
2. (**AIED '22**) S. Poulsen, S. Kulkarni, G. Herman, and M. West. "Benchmarking partial credit grading algorithms for Proof Blocks problems". In *Artificial Intelligence in Education - 23rd International Conference, (AIED)* 2023. [link]
3. (**IMPACT '22****) S. Kulkarni and M. Kruse. "Polyhedral Binary Decision Diagrams for Representing Non-Convex Polyhedra". In *The 12th International Workshop on Polyhedral Compilation Techniques (IMPACT)* 2022. [link]

4. (**Algorithmica '21***) K. Chandrasekaran, E. Grigorescu, G. Istrate, S. Kulkarni, Y.S. Lin, and M. Zhu. "The maximum binary tree problem". *Algorithmica, 83:1–42, 08 2021.* [link]
(**ESA '20**) Preliminary version in *European Symposium on Algorithms (ESA)* 2020. [link]

5. (**IPEC '20***) K. Chandrasekaran, E. Grigorescu, G. Istrate, S. Kulkarni, Y.S. Lin, and M. Zhu. "Fixed-parameter algorithms for longest heapable subsequence and maximum binary tree.". In *In 15th International Symposium on Parameterized and Exact Computation (IPEC)* 2020. [link]

6. (**FSTTCS '20***) A. Block, J. Blocki, E. Grigorescu, S. Kulkarni, and M. Zhu. "Locally decodable/correctable codes for insertions and deletions". In *40th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science, (FSTTCS)* 2020. [link]

7. (**ITC '20***) J. Blocki, S. Kulkarni, and S. Zhou. "On locally decodable codes in resource bounded channels". In *Information Theoretic Cryptography (ITC)* 2020. [link]

8. (**ROCKY '17**) A. Cleary, T. Ramaraj, I. Kahanda, J. Mudge, S. Kulkarni, and B. Mumey. "Exploring Frequented Regions in Pan-Genomic Graphs." In *The 15th Annual Rocky Mountain Bioinformatics Conference (ROCKY)* 2017.

Manuscripts in Submission

1. *K. Bérczi, K. Chandrasekaran, T. Király, and S. Kulkarni. "Hypergraph connectivity augmentation in strongly-polynomial time". *In submission 2024.* [link]

2. *K. Bérczi, K. Chandrasekaran, T. Király, and S. Kulkarni. "Splitting-off in hypergraphs". *In submission 2024.* [link]

3. *K. Chandrasekaran, C. Chekuri, S. Fiorini, S. Kulkarni, and S. Weltge. "Polyhedral aspects of feedback vertex set and pseudoforest deletion set". *In submission 2024.* [link]

Select Technical Coursework

Graduate: Numerical Analysis, Advanced Data Structures, Combinatorial Optimization, Randomized Algorithms, Approximation Algorithms, Complexity Theory, Combinatorial Mathematics, Integer Programming, Algorithms for Big Data, Extremal Graph Theory, Linear Algebra, Passwords and Human Authentication, Mathematical Toolkit for CS, Algorithm Design, Analysis and Implementation, Economics and Computation, Reasoning About Programs.

Undergraduate: Algebra, Probability, Analysis of Algorithms, Data Structures, Artificial Intelligence, Data Mining, Operating Systems.

Relevant Activities

Speaker at 25th International Symposium on Mathematical Programming (ISMP '24)	July 2024
Visiting Researcher at Institute for Computational & Experimental Research in Mathematics	Jan '23 - May '23
Visiting Researcher at Eötvös Loránd Univeristy	Aug '22 - Nov '22
Organizer of Approximation Algorithms Reading Group (Purdue University)	May '20 - Aug '20
Organizer of Advanced Algorithms Reading Group (Purdue University)	Jan '20 - May '20
Disability Resource Center Note-taker	Jan '16 - May '16

Scholarships

Purdue University Nylin Scholarship	2018
Purdue University Grub Scholarship	2017
Purdue University Corporate Partner Scholarship sponsored by Crowe Horwath (now Crowe Global)	2016