Jain, Shweta – CV

Email: shweta.jain@utah.edu | Webpage: https://sjain12.github.io/

Research Interests

Randomized and approximation algorithms, parameterized algorithms, graph mining, and algorithms for massive data.

Research Vision

To design algorithms for big data, especially graph algorithms, that have provable guarantees and work well on real-world instances.

Current Appointment

2021- Postdoc, University of Utah, Salt Lake City (Advisor: Prof. Blair D. Sullivan)

Past Appointment

2020-2021 Postdoc, University of Illinois, Urbana-Champaign (Advisor: Prof. Hanghang Tong)

Education

2014–2020 Ph.D., Computer Science, University of California, Santa Cruz
Thesis: Counting cliques in real-world graphs (Advisor: Prof. Seshadhri Comandur)

2012–2013 M.S., Computer Science, University of Chicago

2005–2009 B.E., Computer Engineering, Pune Institute of Computer Technology (PICT)

Select Honors and Awards

2021 Awarded the Computing Innovation Fellowship by the CRA and the CCC for a 2-year postdoc. About 50 students were awarded from all over the country from among >500 applicants.

2021 Awarded the SIGKDD Best Dissertation Award - Runner-Up. Awarded to the 2^{nd} most innovative and impactful disseration in Data Science, internationally.

2020 CSE Best Dissertation Award, UCSC, 2020

2020 Best Paper Award at WSDM, 2020. Awarded to the Best Research Paper from among 615 submitted papers.

2020 EECS Rising Star, Berkeley, 2020

2019 Best Poster Award, Foundations of Data Science Workshop, GeorgiaTech, Atlanta

2018 BSOE Dissertation Year Fellowship, 2018-19

2017 Best Paper Award at WWW, 2017. Awarded to the Best Research Paper from among >1000 submitted papers.

2014 UC Santa Cruz Regents' Fellowship, 2014

Publications and Preprints

[1] **Jain, S**., Mizutani, Y., Sullivan, B. D., Faster Decomposition of Weighted Graphs into Cliques using Fisher's Inequality. preprint: https://arxiv.org/pdf/2206.07286.pdf.

[2] **Jain, S**., Tong, H., YACC: A Framework Generalizing TuránShadow for Counting Large Cliques. In SIAM International Conference on Data Mining (SDM), 2022.

[3] **Jain, S**., Behera, B., Seshadhri, C., Improved FPT bounds for finding maximal dense subgraphs in c-closed graphs. In Innovations in Theoretical Computer Science (ITCS), 2022.

[4] **Jain, S**., Seshadhri, C., The power of pivoting for exact clique counting. In Proceedings of the 13th ACM International Conference on Web Search and Data Mining (WSDM), 2020. **Winner of Best Paper Award**.

[5] **Jain, S**., Seshadhri, C., Provably and Efficiently Approximating Near-cliques using Turán Shadow: PEANUTS. In The Web Conference (formerly WWW), 2020.

[6] Nassar, H., Gleich, D., Benson, A., **Jain, S**. and Kennedy, C., Using cliques with higher-order spectral embeddings improves graph visualizations. In The Web Conference (formerly WWW), 2020.

[7] Eden, T., **Jain, S**., Pinar, A., Ron D., Seshadhri, C., Provable and practical approximations for the degree distribution using sublinear graph samples. In The Web Conference (formerly WWW), 2018.

[8] **Jain, S**., Seshadhri, C., A Fast and Provable Method for Estimating Clique Counts Using Turán's Theorem. In 26th International Conference on World Wide Web (WWW), 2017. **Winner of Best Paper Award.**

[9] Kadekodi, S., **Jain, S**., Taking Linux Filesystems to the Space Age: Space Maps in Ext4. In Ottawa Linux Symposium, 2010.

Service

Program Committees: SDM 2021, CIKM 2021, WWW 2021, ESA 2022, WWW 2022
External Reviewer: TKDE 2019, TKDD 2019, Algorithmica 2019, TKDD 2020, TKDE 2020, TWEB 2020, DAMI 2020, TWEB 2021, PVLDB 2021

Work Experience

2016 **Summer Intern, Sandia National Labs**, Livermore, CA (Mentor: Ali Pinar)
Developed an algorithm for estimating the degree distribution of a graph by simulating edge sampling using vertex sampling. Paper published at The Web Conference, 2018.

2013 **Visiting Pre-doctoral Fellow, Northwestern University** (Mentor: Prof. Jason Hartline)
Studied the structural properties of revenue-optimal mechanisms for a multi-dimensional unit-demand agent, including variants with supply and allocation constraints.

2011–2012 **Associate Engr., Oneirix Engineering Labs Pvt. Ltd.**, Pune, India (Mentor: Udayan Kanade)
As part of the Computer Science Research Group, work included simulating optical phenomena including scattering and fluorescence using the Monte Carlo method, writing a nonlinear static equilibrium solver and performing spline based shape optimization of mechanical parts, and creating tools to manipulate huge image datasets in real time.

Teaching Assistance

2015 CMPS101, Algorithms and Abstract Data Types, University of California, Santa Cruz
2017 CMPS12B/M, Introduction to Data Structures, University of California, Santa Cruz

Students Mentored

Balaram Behera, senior year, University of California, Santa Cruz
Andrew Fraser, Arvinda Kanchana Ruwanpathirana, Benjamin Eagar, Fangfei Lan, Frost Mitchell, Ph.D. students, University of Utah

Invited Talks

2022	Putting Parameterization into Practice - Poster presentation at the NITRD 30th Anniversary Symposium
2022	FPT Algorithms for Finding Near-Cliques in c-Closed Graphs, Paper Presentation at ITCS, 2022
2021	Counting Cliques in Real-World Graphs - Talk at the University of Utah
2021	Counting Cliques in Real-World Graphs - Talk at the SIGKDD Dissertation Award Ceremony
2021	Counting Cliques in Real-World Graphs - Talk at IDEA Lab, University of Illinois, Urbana-Champaign
2020	Counting Cliques in Real-World Graphs - Talk at CS4Math, Harvard
2020	Counting Cliques in Real-World Graphs - Talk at Algorithms and Complexity Seminar, MIT
2020	Counting Cliques in Real-World Graphs - Talk at Theory Lunch, Carnegie Mellon University
2020	Counting Cliques in Real-World Graphs - Talk at Theory Lunch, GeorgiaTech
2020	Counting Cliques in Real-World Graphs - Talk at Meta (Formerly Facebook)
2020	Counting Cliques in Real-World Graphs - Talk at Amazon
2020	Counting Cliques in Real-World Graphs - Talk at RelationalAI
2020	Counting Cliques in Real-World Graphs - Talk at Microsoft Research, India
2020	Counting Near-Cliques using the TuránShadow - Paper presentation at WWW, 2020
2020	The Power of Pivoting for Exact Clique Counting - Paper presentation at WSDM, 2020
2019	An $O(3^{\frac{n}{3}})$ algorithm for clique counting - Student talk at Theory of Computing Associated - Silicon Valley (TOCA-SV) at Google
2019	Estimating degree distribution - Talk at Stanford Theory Lunch
2018	Turán Shadow and its Extensions - Talk at Purdue University
2018	Applications of Sampling in Graphs - Talk at LIP6, Sorbonne University, Paris, France
2018	Estimating Degree Distribution - Paper presentation at The Web Conference (formerly WWW)
2018	Estimating Degree Distribution - Student talk at Theory of Computing Associated - Silicon Valley (TOCA-SV) at Google
2018	Clique Counting - Talk at Oneirix Engineering Labs
2018	Graph Mining - Talk at K. K. Wagh Polytechnic
2017	Clique Counting - Student talk at Theory of Computing Associated - Silicon Valley (TOCA-SV) at Google
2017	Clique Counting - Paper presentation at the International Conference on World Wide Web (WWW)
2017	Clique Counting - Poster presentation at Symposium on the Theory of Computing (STOC)
2016	Clique Counting - Student talk at Women in Theory (WIT)