Jain, Shweta – CV

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Research Interests

Randomized and approximation algorithms, combinatorial optimization, graph mining, algorithms for massive data

Current Appointment

2021- Postdoc, University of Utah, Salt Lake City (Advisor: Prof. Blair 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 Title: 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)
Thesis Title: Space Maps in Ext4

Selected Honors and Awards

2021 Awarded the CIFellowship
2021 Awarded the SIGKDD Best Dissertation Award - Runner-Up.
2020 CSE Best Dissertation Award, UCSC, 2020
2020 Best Paper Award at WSDM, 2020.
2020 Selected for Rising Stars Workshop, 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.
2014 UC Santa Cruz Regents' Fellowship, 2014
2010 Best Alumni Research (PICT), 2010

Publications

[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.

Program Committees

SDM 2020, CIKM 2021, WWW 2021, ESA 2022, WWW 2022

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, UCSC

Invited Talks

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 University of Utah, Utah, USA
2021 Counting Cliques in Real-World Graphs - Talk at IDEA Lab, University of Illinois, Urbana-Champaign, IL, USA
2020 Counting Cliques in Real-World Graphs - Talk at CS4Math, Harvard, Cambridge, MA, USA
2020 Counting Cliques in Real-World Graphs - Talk at Theory Lunch, MIT, Cambridge, MA, USA
2020 Counting Cliques in Real-World Graphs - Talk at Theory Lunch, Carnegie Mellon University, Pittsburgh, PA, USA
2020 Counting Cliques in Real-World Graphs - Talk at Theory Lunch, GeorgiaTech, Atlanta, GA, USA
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 at Houston, TX, USA
2019 An $O(3^{\frac{n}{3}})$ algorithm for clique counting - Talk at Theory of Computing Associated - Silicon Valley (TOCA-SV)
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 at Lyon, France
2018 Estimating Degree Distribution - Student talk at Theory of Computing Associated - Silicon Valley (TOCA-SV) at Google

2017 Clique Counting - Student talk at TOCA-SV @ Google
2017 Clique Counting - Paper presentation at the 26th 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)