Department of Computer Science

Bridging Theory and Practice in Parallel Graph Processing

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Hosted by Ioannis Koutis

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https://cs.njit.edu/seminars

Abstract:
Large-scale graph processing is a fundamental tool in modern data mining, yet poses a major computational challenge as graph sizes increase. In this talk, I will describe my work on designing highly scalable and provably-efficient algorithms for a broad class of computationally expensive graph problems. My research approach is to bridge theory and practice in parallel algorithms, which has resulted in the first practical solutions to a number of problems on graphs with hundreds of billions of edges. This talk will focus on new parallel algorithms for nucleus decomposition and correlation clustering, with improved theoretical bounds, demonstrably fast performance on real-world datasets, and real-world impact in production environments at Google. Finally, I will conclude with my future research plan on designing solutions to real-world data problems using a cross-disciplinary perspective in theory, systems, and architecture, with a focus on bridging the gaps between industry and academia.

Bio:
Jessica Shi is a final year PhD student at MIT in the EECS department, where she is advised by Julian Shun. She is also a Student Researcher at Google on the Graph Mining team, where she is mentored by Jakub Łącki. Jessica's current research interests include developing shared-memory parallel graph algorithms with provable theoretical guarantees and efficient scalable implementations. She is supported by a 2018 NSF Graduate Research Fellowship, and her work has been recognized with a best paper award at SPAA 2022 and a best student presentation award at ACDA 2021.