Neha Makhija
nehamakhija.github.io

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Research Interests

Can we design unified algorithms that automatically work as efficiently as theory allows for any given input problem instance (i.e., have instance-optimality), thus achieving the best of both theory and practice? I study this question in the domain of explainable data management, provenance, and knowledge representation.

Education

- PhD in Computer Science — Sept 2019 - Present
  DataLab at Northeastern University, Khoury College of Computer Sciences — GPA: 3.97 / 4
  Advised by: Dr. Wolfgang Gatterbauer

- Bachelor of Engineering (Computer Engineering) — 2015 - 2019
  Thadomal Shahani Engineering College, University of Mumbai — GPA: 9.15 / 10
  Advised by: Dr. Archana Patankar

Publications and Preprints

- A Unified Approach for Resilience and Causal Responsibility with Integer Linear Programming (ILP) and LP Relaxations **[SIGMOD 2024]**
  Neha Makhija, Wolfgang Gatterbauer
  [ACM] [Arxiv (long version)] [Webpage] [Slides]

- Minimally Factorizing the Provenance of Self-Join Free Conjunctive Queries **[PODS 2024]**
  Neha Makhija, Wolfgang Gatterbauer
  [ACM] [Arxiv (long version)] [Slides]

- Discovering Dichotomies for Problems in Database Theory **[VLDB PhD Workshop 2023]**
  Neha Makhija, Wolfgang Gatterbauer
  [VLDB] [Arxiv] [Webpage]

- Loch Prospector: Metadata Visualization for Lakes of Open Data
  Neha Makhija, Mansi Jain, Nikolaos Tziavelis, Laura Di Rocco, Sara Di Bartolomeo, Cody Dunne
  [Short Paper at IEEE VIS 2020]
  [IEEE VIS] [OSF] [Video] [Teaser] [Webpage]

Experience

- **Simons Institute, University of California, Berkeley,** Visiting Graduate Student — Aug - Dec 2023
  Workshop on "Logic and Algorithms in Database Theory and AI" [Workshop Webpage]
  Invited Talk: "A Unified Approach for Reverse Data Management" [Talk Webpage] [Video]

- **RelationalAI,** Summer Research Intern — May - Aug 2023

- **RelationalAI,** Summer Research Intern — May - Aug 2022

- **IBM Research, Yorktown Heights,** Summer Research Intern — May - Aug 2021

- **Ushva Clean Technology,** Machine Learning Intern — Nov 2017 - Aug 2018

Honours & Awards

- Graduate Fellowship, Northeastern University — 2019
- Principal's Award of Excellence, Thadomal Shahani Engineering College — 2019
- Leadership Award, Thadomal Shahani Engineering College — 2019

Teaching

- Teaching Assistant, CS7240: Principles of Scalable Data Management: Theory, Algorithms and Database Systems — Spring 2023
- Head Teaching Assistant, CS3200: Database Design — Fall 2022

Service

- Reviewer, VLDB 2025
- Microsoft TEALs: Volunteer at Match Charter Public High School Boston, Academic Year 2021-22
- MIT Spark Lecture: 'Introduction to Graph Theory (With Puzzles!)', 2022 [Slides]
- Organizer, Northeastern PhD Open House 2022

Graduate Coursework

Advanced Algorithms, Large Scale and Parallel Data Processing, Scalable Database Management, Information Visualization, Distributed Systems, Graph Theory, Effective Scientific Communication