Rohan Yadav

Education

2020–Present **Ph.D. in Computer Science**, *Stanford University*, Stanford, CA.
Advised by Alex Aiken and Fredrik Kjolstad

2015–2019 **BS in Computer Science**, *Carnegie Mellon University*, Pittsburgh, PA.
Advised by Umut Acar
Dean's List, University and SCS College Honors

Experience

2023-Present **Part-time Contractor**, *NVIDIA*, Santa Clara, CA.
- Working on distributed programming systems.

2023 **Research Intern**, *NVIDIA*, Santa Clara, CA.
- Researching compilation-based techniques to compose parallel programs in the Legate framework.

2022 **Research Intern**, *NVIDIA*, Santa Clara, CA.
- Developed `legate.sparse`, a distributed and accelerated drop-in replacement for `scipy.sparse`.

2019-2020 **Software Engineer**, *Cockroach Labs*, New York, NY.
- Improved stability and performance of CockroachDB's distributed SQL engine and schema management infrastructure.
- Contributed to development of a variety of large features in CockroachDB including ENUM types, User Defined Schemas, and Online Primary Key Changes.

2018 **Software Engineering Intern**, *Uber Advanced Technologies Group*, San Francisco, CA.
- Developed infrastructure for a migration from an internal data center to AWS.
- Implemented a file access system within AWS for integration with existing data center services.
- Dramatically enhanced scalability of batch compute jobs processing internal data.

2017 **Software Engineering Intern**, *Facebook*, Menlo Park, CA.
- Developed system to perform disruptive upgrades on network switches.
- Added packet subscription service for network switch agent debugging and maintenance.

Selected Research Projects

2023 **Composing Distributed Computations Through Task and Kernel Fusion** *with Michael Bauer, Shiv Sundram, Wonchan Lee, Michael Garland, Alex Aiken, Fredrik Kjolstad*
Developed dynamic program analysis techniques to fuse computations across library boundaries on distributed machines, enabling applications built through the composition of high-level libraries to approach the performance of hand-written code.

2022 **Legate Sparse** *with Michael Bauer, Wonchan Lee, Manolis Papadakis, Melih Elibol, Michael Garland*
Developing `legate.sparse` a distributed and GPU-accelerated drop-in replacement for `scipy.sparse`, enabling supercomputer scale performance from high-level Python code.

2021-2022 **Compiling Tensor Computations to Supercomputers** *with Fred Kjolstad, Alex Aiken*
Developed DISTAL, a compiler for sparse and dense tensor algebra that targets distributed systems.

2020 **Automated Mapping of Computation and Data** *with Alexandra Henzinger, Thiago Teixeira, Alex Aiken*
Developed system to automatically discover strategies for mapping computation and data onto different processors and memories in a heterogenous system.

2018-2019 **Disentanglement** *with Sam Westrick, Umut Acar*
Designed efficient memory management systems for the memory access patterns of fork-join parallel programs.

Publications

SC 2023 **Legate Sparse: Distributed Sparse Computing in Python** *Rohan Yadav, Wonchan Lee, Melih Elibol, Manolis Papadakis, Taylor Lee-Patti, Michael Garland, Alex Aiken, Fredrik Kjolstad, Michael Bauer*

SC 2023 **Automated Mapping of Task-Based Programs onto Distributed and Heterogenous Machines** *Thiago S. F. X. Teixeira, Alexandra Henzinger, Rohan Yadav, Alex Aiken*

SC 2022 **SpDISTAL: Compiling Sparse Distributed Tensor Computations** *Rohan Yadav, Alex Aiken, Fredrik Kjolstad*

PLDI 2022 **DISTAL: The Distributed Tensor Algebra Compiler** *Rohan Yadav, Alex Aiken, Fredrik Kjolstad*

OOPLSA 2021 **Compilation of Sparse Array Programming Models** *Rawn Henry, Olivia Hsu, Rohan Yadav, Stephen Chou, Kunle Olukotun, Saman Amarasinghe, Fredrik Kjolstad*

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POPL 2020 **Disentanglement in Race-Free Nested Parallel Programs** *Sam Westrick, Rohan Yadav, Matthew Fluet, Umut A. Acar*

Undergraduate Thesis **Disentanglement, Theory and Practice** *Rohan Yadav*

SPAA 2019 **Brief Announcement: A Parallel Algorithm for Subgraph Isomorphism** *Rohan Yadav, Umut A. Acar*

Submitted for Publication (Under Review)

2023 **Composing Distributed Computations Through Task and Kernel Fusion** *Rohan Yadav, Shiv Sundram, Wonchan Lee, Michael Garland, Michael Bauer, Alex Aiken, Fredrik Kjolstad*

Awards

2024 Jane Street Graduate Research Fellowship (Finalist)
2023 NVIDIA Graduate Research Fellowship
2020 NSF Graduate Research Fellowship
2019 CRA Outstanding Undergraduate Researcher Nominee
2019 Carnegie Mellon Senior Leadership Recognition
2015 Presidential Scholar Semifinalist

Talks

Legate Sparse: Distributed and Accelerated Sparse Computing in Python
- SIAM Parallel Processing, March 2024
- UW PLSE Seminar, December 2023
- SC 2023, November 2023
- UIUC Compilers Seminar, October 2023
- MIT Fast Code Seminar, October 2023
- CMU Catalyst Group Meeting, October 2023
- Berkeley Programming Systems Seminar, September 2023
- Stanford HPC-AI Advisory Council, February 2023

SpDISTAL: Compiling Sparse Distributed Tensor Computations
- Legion Retreat, December 2022
- AHA Affiliates Retreat, December 2022
- SC 2022, November 2022
- Stanford Software Research Lunch, April 2022

DISTAL: The Distributed Tensor Algebra Compiler
- Google Research, November 2022 (Invited)
- PLDI 2022, June 2022
- Vienna University of Technology, April 2022 (Invited)
- Stanford Agile Hardware Project Group Meeting, Jan 2022
- Cerebras Systems, Dec 2021 (Invited)
- Oxford Tensor Computations Seminar, Nov 2021
- Stanford Software Research Lunch, Nov 2021

On the Automated Mapping of Computation and Data Onto Heterogenous Machines
- Stanford Software Research Lunch, Feb 2021
- Legion Developer Meeting, Jan 2021

A Parallel Algorithm for Subgraph Isomorphism
- SPAA 2019, Jun 2019

Disentanglement, Theory and Practice
- CMU Meeting of the Minds, May 2019

Teaching

2023 **Teaching Assistant** *Stanford CS143* Compilers
2021-2022 **Teaching Assistant** *Stanford CS242* Programming Languages
2017-2018 **Head Teaching Assistant** *CMU 15210* Parallel Algorithms and Data Structures

2016 **Teaching Assistant** *CMU 15150* Functional Programming

2018-2020 **Diderot**

Developed and maintained a new course management platform, now used by 1500 students daily at CMU.