Rachit Nigam

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I am a visiting scholar at MIT and PhD student at Cornell working on programming languages, compilers, and computer architecture. My research is about building and using *specialized hardware accelerators*. I have published papers at top conferences in programming languages and computer architecture and designed tools that have been adopted by researchers and practioners.

Education

Cornell University

Doctor of Philosophy in Computer Science — *2018 - Present*

- Masters in Computer Science, 2021
- Committee: Adrian Sampson (chair), Zhiru Zhang, Nate Foster, Chris De Sa

University of Massachusetts Amherst

Bachelors in Computer Science | Summa cum laude — *2015 - 2018*

- Thesis: *Execution Control for JavaScript*, Distinction with Highest Honors
- Committee: Arjun Guha (chair), Emery Berger

Publications

PLDI '23 *Modular Hardware Design with Timeline Types*
Rachit Nigam, Pedro Henrique Azevedo de Amorim, Adrian Sampson

ASPLOS '23 *Stepwise Debugging for Hardware Accelerators*
Griffin Berlstein, **Rachit Nigam**, Chris Gyurgyik, Adrian Sampson

ASPLOS '21 *A Compiler Infrastructure for Accelerator Generators*
Rachit Nigam[†], Samuel Thomas[†], Zhijing Li, Adrian Sampson ([†]*Equal authors*)

ASPLOS '21 *Vectorization for Digital Signal Processors via Equality Saturation*
Alexa VanHattum, **Rachit Nigam**, Vincent Lee, James Bornholt, Adrian Sampson

PLDI '20 *Predictable Accelerator Design with Time-Sensitive Affine Types*
Rachit Nigam, Sachille Atapattu, Samuel Thomas, Theodore Bauer, Apurva Koti, Zhijing Li, Yuwei Ye, Adrian Sampson, Zhiru Zhang

PLDI '18 *Putting in All the Stops: Execution Control for JavaScript*
Samuel Baxter, **Rachit Nigam**, Arjun Guha, Joe Gibbs Politz, Shriram Krishnamurthi

Ongoing Work

In Preparation *Correct-by-construction Parametric Hardware Design*
Rachit Nigam, Ethan Gabizon, Edmund Lam, Adrian Sampson

In Preparation *Unifying Dynamic and Static Interfaces for Accelerator Generation*
Calem Kim, Pai Li, Anshuman Mohan, Andrew Butt, Adrian Sampson, and **Rachit Nigam**

In Preparation *Customizing Memory Structures for High-Level Synthesis*
Andrew Butt, Matthew Hoffman, **Rachit Nigam**, Zhiru Zhang

In Preparation *Abstractions for User-Scheduable Languages*
Yuka Ikarashi, Samir Droubi, Kevin Qian, **Rachit Nigam**, Gilbert Louis Bernstein, and Jonathan Ragan-Kelley

Experience

Visiting Scholar, Massachusetts Institute of Technology 05/23–Now
Graduate Research Assistant, Cornell University 08/18–Now
Visiting Scholar, University of Washington 08/22–04/23
Research Intern, Facebook Reality Labs 05/19–08/19
Software Engineering Intern, Google 05/18–08/18
Research Assistant, University of Massachusetts Amherst 05/16–05/18
Visiting Researcher, Brown PLT, Brown University 05/17–08/17

Selected Awards

Distinguished Artifact Award, ASPLOS 2023
Jane Street Fellowship, Jane Street 2023
Departmental Nominee, Google Fellowship 2020
Finalist, Qualcomm Innovation Fellowship 2020
Outstanding Teaching Assistant, Cornell CIS 2019
Dean's Merit Scholarship, UMass Amherst 2018
Honors Research Fellowship, UMass Amherst 2017
Chancellor's Scholarship, UMass Amherst 2015

Academic Service

Student Research Competition Co-chair, PLDI 24 2024
External Review & Artifact Evaluation Committees, OOPSLA 23 2023
Organizer, Workshop on Languages, Tools, and Techniques for Accelerator Design 2023
Organizer, Workshop on Languages, Tools, and Techniques for Accelerator Design 2022
Organizer, Workshop on Languages, Tools, and Techniques for Accelerator Design 2021
Social Chair, PLDI 23 2022
Social Chair, PLDI 22 2021
Social Chair, PLDI 21 2021
Sub-reviewer, ISCA 21 2021
Artifact Evaluation Committee, OOPSLA 20 2020
Artifact Evaluation Committee, PLDI 20 2020
Artifact Evaluation Committee, PLDI 19 2019
Volunteer, SPLASH 18 2018

Other Service

Founder, Programming Languages Tea 2020
Vice-President of CS Graduate Organization, Cornell CIS 2020
Organizer, CAPRA External Talk Series 2020
Organizer, Programming Languages Retreat 2019
Member of Graduate Admissions Committee, Cornel CIS 2019
Mentor, Expand Your Horizons, Cornell 2019
Mentor, Eureka! Girls Inc. 2016