Rachit Nigam

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Education

Cornell University

Doctor of Philosophy in Computer Science *2018 - Present*

- Committee: Adrian Sampson (chair), Zhiru Zhang, Nate Foster, Chris De Sa

Cornell University

Masters in Computer Science *2018 - 2021*

- Thesis: *Language-Level Modeling for Hardware Constraints*
- 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

In Submission

A Toolkit for Designing Hardware DSLs
Griffin Berlstein, Rachit Nigam, Chris Gyurgyik, Adrian Sampson
In Submission

In Submission

Strong Consistency for Heterogeneous Packet-Processing Architectures with Packet Treaties
Praveen Kumar, Rachit Nigam, Pierce Douglis, Melissa Ginaldi, Mina Tahmasbi Arashloo, Robert Soulé, Adrian Sampson, Nate Foster
In Submission

ASPLOS 2021

A Compiler Infrastructure for Accelerator Generators
Rachit Nigam[†], Samuel Thomas[†], Zhijing Li, Adrian Sampson
([†]*Equally contributing authors*)
In *Architectural Support for Programming Languages and Operating Systems*.

ASPLOS 2021

Vectorization for Digital Signal Processors via Equality Saturation
Alexa VanHattum, Rachit Nigam, Vincent Lee, James Bornholt, Adrian Sampson
In *Architectural Support for Programming Languages and Operating Systems*.

LCTES 2020

A Synthesis-aided Compiler for DSP Architectures (WiP Paper)
Alexa VanHattum[†], Rachit Nigam[†], Vincent Lee, James Bornholt, Adrian Sampson
([†]*Equally contributing authors*)
In *International Conference on Languages, Compilers, and Tools for Embedded Systems*.

PLDI 2020

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
In *ACM SIGPLAN Conference on Programming Language Design and Implementation*.

PLDI 2018

Putting in All the Stops: Execution Control for JavaScript
Samuel Baxter, Rachit Nigam, Arjun Guha, Joe Gibbs Politz, Shriram Krishnamurthi
In *ACM SIGPLAN Conference on Programming Language Design and Implementation*.

SNAPL 2017

Fission: Secure Dynamic Code-Splitting for JavaScript
Arjun Guha, Jean-Baptiste Jeannin, Rachit Nigam, Jane Tangen, Rian Shambaugh
In *Summit oN Advances in Programming Languages*.

Experience

Cornell University
Graduate Research Assistant *08/2018 - Present*
Designing new tools and techniques for compiling high-level languages to hardware designs.

Facebook Reality Labs
Research Intern *05/2019 - 08/2019*
Applied program synthesis techniques to automatically generate correct and efficient hardware for emerging mathematical domains such as log arithmetic.

Google
Software Engineering Intern *05/2018 - 08/2018*
Implemented support for Progressive Web Applications for internal web application framework.

University of Massachusetts Amherst
Research Assistant *05/2016 - 05/2018*
Developed Fission, a compiler for partitioning single-tier JavaScript program while enforcing infromation flow control.

Brown PLT, Brown University
Visiting Researcher *05/2017 - 08/2017*
Developed Stopify, a source to source compiler for JavaScript that provides common debugging abstractions like stopping, stepping and break-pointing, in a browser based IDE for languages that compile to JavaScript.

Awards

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
Racket Summer School Scholarship, University of Utah 2017
CMMRS Travel Scholarship, Max Planck Institute 2017
Finalist, Best Project in Public Interest, HackUMass IV 2016
ICFP Travel Scholarship, ICFP 16 2016
Chancellor's Scholarship, UMass Amherst 2015

Academic Service

Organizer, 1st Workshop on Languages, Tools, and Techniques for Accelerator Design 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

Volunteering

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

Presentations

A Compiler Infrastructure for Accelerator Generators, ASPLOS 2021
A Compiler Infrastructure for Accelerator Generators, LLVM CIRCT Group 2021
Predictable Accelerator Design with Time-Sensitive Affine Types, PLDI 2020
Predictable Accelerator Design, University of California, Berkeley 2020
Predictable Accelerator Design, University of Washington 2020
Predictable Accelerator Design, Imperial College London 2020
Predictable Accelerator Design, Princeton University 2019
Web-based Debugging for Free, NEPLS 2017