

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 - 2020

- 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 Berstein, 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 Douglass, 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 information flow control.

Brown PLT, Brown University

VISITING RESEARCHER

05/2017 - 08/2017

Developed STOIFY, 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, 1 st 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, Cornell 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