

# Rachit Nigam

✉ rachit.nigam12@gmail.com | 🏠 rachitnigam.com | 📄 github.com/rachitnigam

## Education

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### Cornell University

DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

2018 - Present

- Research Interests: High Level Synthesis, Programming Languages
- 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

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### A Compiler Infrastructure for Accelerator Generators

ASPLOS 2021

Samuel Thomas<sup>†</sup>, Rachit Nigam<sup>†</sup>, Zhijing Li, Adrian Sampson

(<sup>†</sup>*Equally contributing authors*)

In *Architectural Support for Programming Languages and Operating Systems*.

### Vectorization for Digital Signal Processors via Equality Saturation

ASPLOS 2021

Alexa VanHattum, Rachit Nigam, Vincent Lee, James Bornholt, Adrian Sampson

In *Architectural Support for Programming Languages and Operating Systems*.

### A Synthesis-aided Compiler for DSP Architectures (WiP Paper)

LCTES 2020

Alexa VanHattum<sup>†</sup>, Rachit Nigam<sup>†</sup>, Vincent Lee, James Bornholt, Adrian Sampson

(<sup>†</sup>*Equally contributing authors*)

In *International Conference on Languages, Compilers, and Tools for Embedded Systems*.

### Predictable Accelerator Design with Time-Sensitive Affine Types

PLDI 2020

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*.

### Putting in All the Stops: Execution Control for JavaScript

PLDI 2018

Samuel Baxter, Rachit Nigam, Arjun Guha, Joe Gibbs Politz, Shriram Krishnamurthi

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

### Fission: Secure Dynamic Code-Splitting for JavaScript

SNAPL 2017

Arjun Guha, Jean-Baptiste Jeannin, Rachit Nigam, Jane Tangen, Rian Shambaugh

In *Summit oN Advances in Programming Languages*.

## Experience

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### Cornell University

GRADUATE RESEARCH ASSISTANT

08/2018 - Present

Developed DAHLIA, a High-Level Synthesis language that hardware resource constraints using affine types and region-based capabilities and improves Design Space Exploration by explicating constraints at the source level.

### 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. Improved tooling for reporting metrics to framework users and added support for running experiments with web applications.

## 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 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

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2019	Outstanding Teaching Assistant	Cornell CIS
2018	Dean's Merit Scholarship	UMass Amherst
2017	Honors Research Fellowship	UMass Amherst
2017	Racket Summer School Scholarship	University of Utah
2017	CMMRS Travel Scholarship	Max Planck Institute
2016	Finalist, Best Project in Public Interest	HackUMass IV
2016	ICFP Travel Scholarship	ICFP 16
2015	Chancellor's Scholarship	UMass Amherst

## Service

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2020	Artifact Evaluation Committee	OOPSLA 20
2020	Organizer	CAPRA External Talk Series
2020	Artifact Evaluation Committee	PLDI 20
2019	Organizer	Programming Languages Retreat
2019	Admissions Committee	College of Computer Science, Cornell
2019	Artifact Evaluation Committee	PLDI 19
2019	Student Mentor	Expand Your Horizons, Cornell
2018	Student Volunteer	SPLASH 18
2016	Student Mentor	Eureka! Girls Inc.

## Presentations

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2020	Predictable Accelerator Design	Princeton University
2020	Predictable Accelerator Design	University of California, Berkeley
2020	Predictable Accelerator Design	University of Washington
2020	Predictable Accelerator Design	Imperial College London
2019	Predictable Accelerator Design	Princeton University
2017	Web-based Debugging for Free	NEPLS