

# Rachit Nigam

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## Education

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### Cornell University

DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

2018 - Present

- Research Interests: Programming Languages, Hardware programming
- Advisor: Dr. Adrian Sampson

### University of Massachusetts Amherst

BACHELORS IN COMPUTER SCIENCE | SUMMA CUM LAUDE

2015 - 2018

- Thesis: *Execution Control for JavaScript*, Distinction with Highest Honors
- Advisor: Dr. Arjun Guha

## Publications

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

Rachit Nigam, Sachille Atapattu, Theodore Bauer, Adrian Sampson, Zhiru Zhang  
*Under Submission*

### 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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### CAPRA, Cornell University

GRADUATE RESEARCH ASSISTANT

08/2018 - Present

- Developed DHALIA, 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 (log arithmetic).

### Google Inc.

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.

### PLASMA, University of Massachusetts Amherst

RESEARCH ASSISTANT

05/2016 - 05/2018

- Developed FISSION, a dynamic tier splitting tool for JavaScript that allows users to write a single program for a web application, instead of two in the traditional tiered application. Implemented dynamic code splitting techniques that preserve security guarantees for private data through Information Flow Control.
- Developed a code synthesis tool for Puppet, a system configuration language, that generates edits for the program using constraints generated by user interaction in the shell. Encoded semantics of Puppet using Z3, an SMT solver, in order to generate edits.

## 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.

## Honors & Awards

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2018	Student Volunteer	ACM SPLASH
2018	Dean's Merit Scholarship	CICS, UMass Amherst
2017	Honors Research Fellowship	Honors College, UMass Amherst
2017	Racket Summer School Scholarship	University of Utah
2017	CMMRS Travel Scholarship	Max Planck Institute for Software Systems
2016	Finalist, Best Project in Public Interest	HackUMass IV
2016	ICFP Travel Scholarship	ICFP 16
2015	Chancellor's Scholarship	UMass Amherst

## Volunteering and Service

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2019	Artifact Evaluation Committee	PLDI 19
2019	Student Mentor	Expand Your Horizons, Cornell
2018	Student Volunteer	SPLASH 18
2016	Student Mentor	Eureka! Girls Inc.

## Invited Talks

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2019	Dahlia: Predictable Accelerator Design with Time-Sensitive Affine types	Princeton University
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