

# Chirag Bharadwaj

PERSONAL INFORMATION	<b>Birthdate:</b> 23 November 1996 <b>Citizenship:</b> United States	<b>Email:</b> chiragb@cs.princeton.edu <b>Phone:</b> +1 609-937-6050
LANGUAGES SPOKEN	English (native), Kannada (bilingual), Spanish (conversational)	
RESEARCH INTERESTS	hardware accelerators, computer architecture, compilers, programming languages, semantics	
EDUCATION	<b>Princeton University</b> , Princeton, NJ <i>Master of Science</i> , MSE, Computer Science 09/2017–06/2019 • GPA: 3.58/4.00 (expected) • Advisor: Margaret Martonosi	
	<b>Cornell University</b> , Ithaca, NY <i>Bachelor of Science</i> , BSc, Computer Science 08/2014–05/2017 • GPA: 3.39/4.00 • Minor: Electrical and Computer Engineering	
RESEARCH EXPERIENCE	<b>Graduate Research Assistant</b> , Princeton University 01/2018– <i>Tools for Estimating the Performance of Decoupled Accelerators</i> Principal Investigator: Margaret Martonosi Estimating the performance of decoupled architectures in specialized hardware accelerators (e.g. GPUs). Using LLVM compiler pass techniques to statically analyze IR dependency graphs in this software-defined simulation. Developing cycle-accurate pre-RTL models of accelerators' computation times in both idealistic and resource-limited settings. Tools intended for use in near-term heterogeneous architectures backed by a sea of accelerators. All modelling done in C++.	
	<b>Undergraduate Research Assistant</b> , Cornell University 01/2017–05/2017 <i>LambdaLab: Interactive <math>\lambda</math>-calculus for Learning</i> Principal Investigator: Adrian Sampson Laid out a theoretical foundation for an interactive visual tool that students could utilize to aid in learning the lambda calculus. Considered pedagogical value for multiple-intelligence learners.	
	<i>Investigating Behavioral Equivalence in Intermediate Representations</i> 08/2016–12/2016 Principal Investigator: Adrian Sampson Generated CPU-like LLVM IR equivalent in behavior to complex NVIDIA CUDA programs. Worked towards an high-level GPU synthesis tool for RTL in a simplified heterogeneous architecture.	
TEACHING EXPERIENCE	<b>Graduate Teaching Assistant</b> , Princeton University 09/2017– • ELE 206: Digital Logic Design • ELE 375: Computer Organization and Architecture	
	<b>Undergraduate Teaching Assistant</b> , Cornell University 01/2015–05/2017 • CS 3410: Digital Logic and Computer Organization (head TA) • CS 3110: Functional Programming and Data Structures (head TA) • CS 2800: Discrete Mathematics and Structures	
PUBLICATIONS	<b>Theses</b> • C Bharadwaj. <i>LambdaLab: Interactive <math>\lambda</math>-calculus for Learning</i> . Cornell University, May 2017.	
	<b>Unpublished Works</b> • C Bharadwaj, SD Goré. <i>Reddit Comments via Generative Grammar Modelling</i> , May 2017. • SK Somayyajula, C Bharadwaj. <i>Refined Logic: Implementing Constructive Logics</i> , Dec. 2016.	

TALKS	<p><b>Princeton University</b></p> <ul style="list-style-type: none"> <li>• <i>Special Topics: Laguerre Polynomials</i>, mathematics seminar, Apr. 2018.</li> </ul> <p><b>Cornell University</b></p> <ul style="list-style-type: none"> <li>• <i>Handy Techniques for Empirical Analysis</i>, mathematics seminar, Apr. 2017.</li> <li>• <i>Musical Groups: Exploring Music with Math</i>, music seminar, Nov. 2016.</li> <li>• <i>Special Topics: Legendre Polynomials</i>, mathematics seminar, Apr. 2016.</li> <li>• <i>A Survey of Japanese Linguistics</i>, linguistics seminar, Oct. 2015.</li> <li>• <i>A Treatise on Complex Analysis</i>, mathematics seminar, Apr. 2015.</li> </ul>	
SCHOLARSHIPS AND AWARDS	<p><b>Princeton University</b></p> <ul style="list-style-type: none"> <li>• Teaching assistantship for engineering graduate study 09/2017–</li> </ul> <p><b>Cornell University</b></p> <ul style="list-style-type: none"> <li>• Outstanding teaching assistant in Computer Science 05/2016, 05/2017</li> <li>• Best final project (PokéSnowdown) in CS 3110 12/2015</li> <li>• Dean’s List in the College of Engineering 12/2014</li> </ul> <p><b>Earlier Honors</b></p> <ul style="list-style-type: none"> <li>• Outstanding achievement in chemistry (2/747) 06/2014</li> <li>• NJ VEX robotics semifinalist team: 750-R 02/2014</li> <li>• National Merit Finalist (1 of 15000) 01/2014</li> <li>• National AP Scholar (score of 4 or higher on eight AP exams) 05/2013</li> <li>• ASCAP Morton Gould Young Composer Honorable Mention (U18 category) 04/2012</li> </ul>	
PROJECTS	<p><b>Research Projects</b></p> <ul style="list-style-type: none"> <li>• <b>apollo</b>: A static pre-RTL tool for performance estimation in hardware accelerators current</li> <li>• <b>refinery</b>: A realization of various refinement logics in OCaml 12/2016</li> </ul> <p><b>Software and Implementations</b></p> <ul style="list-style-type: none"> <li>• <b>redditcommentor</b>: Using generative grammars to model Reddit comments 05/2017</li> <li>• <b>PokéSnowdown</b>: A winter-themed single-player spin-off of Pokémon Showdown 12/2015</li> </ul> <p><b>Notes and Sketches</b></p> <ul style="list-style-type: none"> <li>• <b>Modern Linguistics</b>: A comprehensive treatment of theoretical/applied linguistics on hiatus</li> <li>• <b>Cornell Course Notes</b>: A digitization project of notes taken from Cornell courses on hiatus</li> <li>• <b>Calculus Done Right</b>: A self-teaching approach to learning AP Calculus 01/2011</li> </ul>	
SERVICE AND OUTREACH	<p><b>Princeton University</b></p> <ul style="list-style-type: none"> <li>• Political Engagement Initiative for Asian-American students 10/2017–</li> <li>• Graduate Engineering Council department representative (Computer Science) 09/2017–</li> </ul> <p><b>Cornell University</b></p> <ul style="list-style-type: none"> <li>• Co-mentor for URMs and women in Computer Science 01/2017–05/2017</li> <li>• Mentor for underclassmen in Computer Science 08/2016–12/2016</li> <li>• Freshman orientation leader (group leader) 08/2015, 08/2016</li> <li>• Engineering freshman peer advisor (lead advisor) 08/2015–05/2017</li> <li>• Volunteer piano instructor for adult beginners in local community 08/2015–05/2017</li> <li>• NY Science Olympiad invitational organizer and event moderator 09/2014–02/2017</li> </ul> <p><b>Earlier Volunteering Efforts</b></p> <ul style="list-style-type: none"> <li>• Volunteer AP calculus teaching assistant in Monmouth Junction, NJ 09/2010–05/2014</li> <li>• High school badminton tournament co-organizer 04/2012–04/2014</li> </ul>	

## SKILLS

### Programming and Scripting

- Java, Kotlin, C, C++, OCaml, Python, Ruby, `bash`, `awk`, `sed`

### Verification and Solvers

- Coq, Agda, NuPRL, Lean, SystemVerilog, Z3

### Web Development

- HTML5, CSS/SASS, JavaScript, Dropwizard, JDBC, SQL, Guice, Jekyll, Ruhoh, Nanoc

### Hardware, Assembly, and ISAs

- CUDA, LLVM, ARM, MIPS, RISC-V, LC-3, Verilog, GTKWave, ModelSim, Quartus, SPICE

### Tools and Libraries

- $\LaTeX$ , Markdown, CMake, Makefile, Maven, Gradle, Eclipse, IntelliJ, `vim`, `git`, `svn`, `hg`, `gdb`, `valgrind`, `gprof`, `lex/yacc`, `flex/bison`

## SELECTED

### COURSEWORK

#### Princeton University

- COS 320: Compiling Techniques
- COS 516: Automated Reasoning\*
- COS 521: Advanced Algorithms
- COS 533: Advanced Cryptography
- ELE 575: Advanced Computer Architecture
- ELE 568: Quantum Implementations\*

#### Cornell University

- CS 2043: UNIX and Scripting Tools
- CS 2112: Honors Data Structures and OOP
- CS 2800: Discrete Structures
- CS 3110: Functional Programming
- CS 3410: Computer Organization
- CS 4410: Operating Systems
- CS 4700: Artificial Intelligence
- CS 4750: Mathematical Robotics
- CS 4780: Machine Learning
- CS 4810: Theory of Computation
- CS 4820: Analysis of Algorithms
- CS 4860: Applied Logic
- CS 6110: Advanced Programming Languages
- CS 6810: Advanced Theory of Computation
- ECE 2100: Electrical Circuits
- ECE 2300: Digital Logic Design
- ECE 3140: Embedded Systems
- ECE 3150: Microelectronics
- ECE 4130: Nuclear Science and Engineering
- LING 1101: Introduction to Linguistics