

# Radhika Ghosal

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## RESEARCH INTERESTS

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I am interested in building high-performance domain-specific architectures, languages, and runtimes for articulated robots and autonomous vehicles. More generally, my background is in computer architecture and compilers; I am excited to apply them to different domains: from machine learning to robotics, and beyond.

## EDUCATION

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**Harvard University** Cambridge, MA  
*Ph.D. in Computer Science* September 2019 - May 2025 (Projected)

**Advisors:** Vijay Janapa Reddi, David Brooks, Gu-Yeon Wei

**Relevant Coursework:** Advanced Topics in Computer Architecture, Design of VLSI Circuits and Systems, Underactuated Robotics (MIT), Robotic Manipulation (MIT)

**Indraprastha Institute of Information Technology, Delhi** New Delhi, India  
*B.Tech. in Computer Science & Engineering* August 2019

**Advisor:** Aman Parnami

**Bachelor's thesis:** Rapid prototyping of pneumatically-actuated inflatables

## RESEARCH EXPERIENCE

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**Amazon Robotics** Seattle, WA  
*Applied Scientist Intern* Summer 2023

Robotic manipulation: real-time motion planning and control at [Stow](#).

Mentors: Paul Birkmeyer, Ross Hartley

**Intel Corporation** Remote / Portland, OR  
*Ph.D. Research Intern* Fall 2021

Emerging Systems Security group; designed and implemented a real-time trajectory recovery scheme for collaborative industrial robot arms post-cyber attack.

Mentors: Marcio Juliato, Manoj Sastry

**Microsoft Research** Redmond, WA  
*Undergraduate Research Intern* Summer 2018

Built a modified instruction cache for Microsoft's FPGA-based Deep Neural Network accelerator.

First undergraduate intern to work on [Project Catapult](#).

Mentors: Ming Liu, Steve Reinhardt

**École Polytechnique Fédérale de Lausanne (EPFL)** Lausanne, Switzerland  
*Summer@EPFL Intern* Summer 2017

Implemented a new High-level Synthesis (HLS) technique in LLVM for generating efficient hardware designs from high-level languages (C/C++/OpenCL).

Advisors: Paolo Jenne, Lana Josipovic

**IIIT-Delhi** New Delhi, India  
*Undergraduate Research Assistant* August 2018 - July 2019

Worked on a toolkit for low fidelity prototyping of pneumatically-actuated soft robots.

Advisor: Aman Parnami

*Undergraduate Research Assistant* August 2016 - December 2017

Worked on compiler optimizations for embedded systems; wrote transformation passes for LLVM for the AVR architecture, optimizing for power consumption.

Advisors: Rahul Purandare, Alexander Fell

## SELECTED PUBLICATIONS

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For full list: [Google Scholar page](#).

Sabrina M. Neuman\*, **Radhika Ghosal\***, Thomas Bourgeat, Brian Plancher, Vijay Janapa Reddi; [RoboShape: Using Topology Patterns to Scalably and Flexibly Deploy Accelerators Across Robots](#). **ISCA 2023**: 69:1-69:13. Full paper.

Brian Plancher, Sabrina M. Neuman, **Radhika Ghosal**, Scott Kuindersma, Vijay Janapa Reddi; [GRiD: GPU-Accelerated Rigid Body Dynamics with Analytical Gradients](#). **ICRA 2022**: 6253-6260. Full paper.

Behzad Boroujerdian, **Radhika Ghosal**, Jon Cruz, Brian Plancher, Vijay Janapa Reddi; [Roborun: A Robot Runtime to Exploit Spatial Heterogeneity](#). **DAC 2021**: 829-834. Full paper.

Lana Josipovic, **Radhika Ghosal**, Paolo Ienne; [Dynamically Scheduled High-level Synthesis](#). **FPGA 2018**: 127-136. **Best paper award nominee**.

\* - Equal Contribution.

## PROFESSIONAL SERVICE

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Program Committee, [Mind the Gap: Opportunities and Challenges in the Transition Between Research and Industry](#). RSS 2022 Workshop.

Program Committee, [Workshop on Robotics Acceleration with Computing Hardware](#). MICRO 2022 Workshop.

## AWARDS AND RECOGNITION

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- National Science Foundation Graduate Research Fellowship (NSF GRFP), March 2021
- Student travel grant, ASPLOS 2020
- Best paper award nominee, FPGA 2018
- [Summer@EPFL](#) scholar - one of the 50 selected out of 2000+ applicants worldwide in 2017.

## TEACHING EXPERIENCE

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**Harvard University** Cambridge, MA  
*Teaching Assistant, [Tiny Machine Learning](#)* September 2020 - December 2020  
Led paper discussions, guided course projects, hosted weekly office hours, and graded assignments.

**IIT-Delhi** New Delhi, India  
*Teaching Assistant, [Computer Organization](#)* August 2017 - December 2017  
Held weekly tutorials and office hours, helped prepare and grade assignments and exams.

## SELECTED PROJECTS

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**Vastara** November 2017  
A modular wearables system, consisting of sensors and output modules embedded in cloth patches.

**armsimc** and **armcpu** November 2016  
An ARM simulator in C, and a baby ARM CPU in Verilog.

**Mapbots** April 2016  
Mapped rooms using a ring of ultrasonic sensors mounted on a small robot. Map-generation implemented using the Hough Transform and Kalman Filtering.

**Algosaurus** July 2015  
Started a blog to address the need for quality, approachable resources on algorithms. Has received many compliments for its art.  
(Went viral on [Reddit](#), has received over 100,000 unique visitors till date.)