

Udit Gupta

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Education

Harvard University

PhD Computer Science

2016-Present

Cornell University

Bachelor of Science, GPA - 4.00

2012-2016

Dean's List (All Semesters)

Major: Electrical and Computer Engineering

Minor: Computer Science

Research Interests

Hardware / software co-design, design automation, hardware specialization, **cross-layer heterogeneous architectures** and **emerging computing platforms** focusing on improving programmability, energy efficiency and performance in the context of datacenter and embedded workloads.

Honors and Awards

National Science Foundation GRFP Honorable Mention

2016

Richard A. Newton Young Fellows Scholarship

May 2015 - June 2015

Cornell ECE Early Research Career Scholarship

May 2013 - September 2013

Eta Kappa Nu - Electrical Engineering Honor Society

October 2013 - Present

Publications

Mingxing Tan, Steve Dai, **Udit Gupta** and Zhiru Zhang. "Mapping-Aware Constrained Scheduling for LUT-Based FPGAs". 23rd ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA 2015)

Workshops and Presentations

Udit Gupta, Steve Dai, Zhiru Zhang. "Rosetta: A Realistic Benchmark Suite for Software Programmable FPGAs". Suite of Embedded Applications and Kernels (SEAK 2015)

Steve Dai, **Udit Gupta** and Ritchie Zhao.. "Towards High-Level Programming for FPGAs". Cornell Computer Systems Lab (November 2014)

Research Experience

Heterogeneous Parallel Computing using High Level Synthesis

Cornell University

Professor Zhiru Zhang

December 2013 - Present

Investigating irregular applications and hardware-software abstractions to accelerate designs on reconfigurable accelerators. Exploring high-level programming methodologies using architectures, languages and compilers to improve design productivity and efficiency of system-on-chips and polymorphic specialization of data structures and algorithms. Accelerating and analyzing key applications using OpenCL and C/C++ enabled high level synthesis tools with respect to latency, throughput and area utilization.

Rosetta: A Realistic Benchmark Suite for Software Programmable FPGAs

Cornell University

Professor Zhiru Zhang

December 2014 - Present

Leading a group of 5 undergraduates to design a problem based reconfigurable benchmark suite targeting FPGAs using C/C++ and OpenCL driven HLS tools for applications spanning computer vision, finance, signal processing, security and machine learning domains. Developing a cross-platform infrastructure that couples real-time constraints with applications to provide a realistic benchmark suite for reconfigurable hardware accelerators.

Mitigating Timing Channels for Shared Hardware Accelerators

Cornell University

Professor Zhiru Zhang

January 2015 - May 2015

Developed, simulated and analyzed arbitration techniques to mitigate covert side channels for shared hardware accelerators using Vivado HLS targeting FPGAs.

Distributed Low-Cost Smart Power Sensors with Decentralized Control

Professor Eilyan Bitar

Designed hardware for low cost, high sample rate, distributed and decentralized power sensors. Implemented AMQP messaging framework in C for high frequency communication and a stratum 1 time server on the Raspberry Pi using NTP and an off-chip GPS module.

Cornell University

May 2013 - August 2013

Professional Experience

Hardware Design and Verification Engineering Intern

Algo-Logic Systems

Designed OpenCL board support package for clients to develop and integrate software kernels with existing low latency network IP for the Tick-to-Trade system. Developed software interface for configuring FPGA and OpenCL financial data parsers and trading algorithms.

Santa Clara, CA

May 2015 - August 2015

Teaching Experience

Undergraduate Teaching Assistant

ECE 3140 - Embedded Systems

Cornell University

1 semester

Undergraduate Teaching Assistant

ECE 2300 - Digital Logic Design and Computer Organization

Cornell University

3 semesters

Online Course Design - The Computing Inside Your Smart Phone

Professor David H. Albonesi

Cornell University

May 2014 - September 2014

Project Experience

Medi-Bot: Personalized Autonomous Medicine Delivery Robot

Digital System Design using Microcontrollers Project

Designed and prototyped a personal robot that delivers medicines on a user programmable schedule. The user interfaces with Medi-Bot's processing core, PIC32 microcontroller, using an Android phone over Bluetooth. Integrated Bluetooth HC-05 module, external oscillator for high precision timing, motor controllers and LCD TFT screen with PIC32 microcontroller.

Cornell University

October 2015 - December 2015

Modeling On-Die Termination Power Overhead of Encrypted Data

Resilient Computer Systems Class Project

Modeled the effects of memory encryption on link termination and signal reflections for DDR4 memory technologies. Using MiBench and Pin, a dynamic binary instrumentation tool, we simulated the effects of encrypting data on Data-Bus Inversion memory systems.

Cornell University

March 2015 - May 2015

Master Slave Batcher Network for Resolving Interleaved Memory Accesses

Digital VLSI Design Class Project

Designed and implemented an 8-bit, 8-input master-slave batcher network with 2 input and 4 input sorting units for resolving sort order and inverse sort order for addresses. Implemented a Python based test generation system to automatically generate Verilog-A based test harness for Cadence (Virtuoso) Schematic Simulations.

Cornell University

April 2015 - May 2015

Electrical Subteam Member

CUAir Project Team

Led the drone's cabling, on-board computing and static thrust stand projects where responsibilities included: modeling and implementing wiring of multiple competition planes, testing, stabilizing and interfacing ODROID-XU with wireless system and multiple custom PCB's and implementing Raspberry Pi based data acquisition system for measuring current, voltage, throttle and thrust. Co-Designed a long-range, 802.11 ac wireless system for software based link aggregation and file transfer.

Cornell University

September 2012 - December 2013

Professional Activities

Student Chapter President, Corporate Director

Cornell IEEE

Leading the Cornell IEEE executive board (28 students) to organize corporate and social events for the Cornell ECE community including information sessions, technical talks, professor talks, corporate game nights with over 200 engineers and 8 companies, hardware hackathons, student socials and ECE department sponsored events.

Cornell University

October 2013 - Present

Executive Board Member

Cornell Eta Kappa Nu (HKN)

Cornell University

October 2013 - Present