# Archit Gupta

## Personal Data

275 Li Ka Shing Center
University of California
Berkeley, CA 94704

+1 (510) 833 8411
architgupta@berkeley.edu
http://www.eecs.berkeley.edu/~architgupta
https://github.com/architgupta93

## Education

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| May 2018 -Present | **University of California**, Berkeley, CA<br>PhD candidate, EECS Department<br>**Advisors** - David Foster, Jose Carmena | Gpa: 3.87/4.0 |
| August 2015 -May 2018 | **University of California**, Berkeley, CA<br>MS, EECS Department<br>**Advisor** - Jaijeet Roychowdhury | Gpa: 3.85/4.0 |
| July 2011 -April 2015 | **Indian Institute of Technology**, Mumbai, India<br>B.Tech (Honors) in Electrical Engineering<br>Minor: Computer Science and Engineering | Gpa: 9.55/10.0 |

## Publications

[1] A. Gupta. Table-based device modeling: Methods and applications. 2018.

[2] A. Gupta, A. G. Mahmutoglu, and J. Roychowdhury. A-LA-CARTE: A LAgrange interpolant using Chebyshev sampling for Accurately Representing Table modEls. In *TECHCON*, 2017.

[3] A. Gupta, T. Wang, A. G. Mahmutoglu, and J. Roychowdhury. STEAM: Spline-based tables for efficient and accurate device modelling. In *2017 22nd Asia and South Pacific Design Automation Conference (ASP-DAC)*, pages 463–468. IEEE, 2017.

[4] K. Kumar, A. Gupta, R. Shah, A. Karandikar, and P. Chaporkar. On analyzing indian cellular traffic characteristics for energy efficient network operation. In *2015 Twenty First National Conference on Communications (NCC)*, pages 1–6. IEEE.

[5] A. G. Mahmutoglu, T. Wang, A. Gupta, and J. Roychowdhury. Well-posed device models for electrical circuit simulation, 2017.

## Research

**Understanding the role of hippocampal sequences in spatial planning and memory.**
**Advisors:** David Foster, Jose Carmena [Doctoral Thesis]
We study spontaneous reactivation of sequences in the hippocampus. Employing fast real-time decoding from hundreds of simultaneously recorded cells and electrical/optogenetic manipulation allows us to establish causal relationships between different types of sequences observed in the hippocampus and behavior.

**In-vivo, closed loop targeting of Hippocampal pyramidal cells.**
Hippocampus consists of a thin layer ($\sim 40 - 100\mu m$ in a rat) of pyramidal cells that are believed to play a significant role in memory formation and spatial navigation. It is also one of the most widely studied brain regions. Targeting this cell layer is technically difficult, often requiring years of experience in electrophysiology and hundreds of human hours for each individual subject. We are working on a closed loop methodology to target cells in the Hippocampus by using electrical feedback from the recording electrodes to navigate the brain.

**Table-based device modeling - Methods and Applications**
**Advisor:** Jaijeet Roychowdhury [MS Thesis]
As semiconductor devices shrink, physics-based models have to be refined with empirical parameters and equations to account for newly observed phenomenon. This eventually slows down these models, often pushing circuit simulation times to weeks and months even for modest designs. We proposed polynomial interpolation techniques to bridge the gap between realistic physics-based models and fast circuit simulation. In [1, 3], we demonstrate how multidimensional splines and Chebyshev interpolants can be used to accelerate circuit simulation without losing the modeling accuracy that physics-based models offer.

## Posters & Presentations

A. Gupta, J. Roychowdhury. ABCD-CPS: Accurate Booleanization of Continuous Dynamics for Cyber-Physical systems, *AMS Design Automation Workshop, ICCAD 2017.*

## Academic Services

[2018-Present] Reviewer, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems.

## Work Experience

**May - June 2014** — SoC Design and Optimization at SAMSUNG DMC RnD Center, Suwon South Korea — Guide: Dr. Dongjin Lee

Designed a controller for Samsung's Temperature Sensing analog IP. Integrated and synthesized the controller along with other peripherals into an SoC. Developed a glitch free mechanishm to switch clocks using Clock Gating Cells. Optimized the design for power consumption (improving gating efficiency) and empirically evaluated the energy complexity of algorithms on the aforementioned SoC

**Jan 2013 - May 2014** — Teaching Assistant at Indian Institute of Technology, Bombay

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|---|---|---|---|
| MA 106 | Linear Algebra | Prof. Neela Natraj | Jan - Mar 2013 |
| MA 108 | Differential Equations | Prof. U. K. Anandvardhanan | Mar - May 2013 |
| MA 106 | Linear Algebra | Prof. Murali K. Srinivasan | Jan - Mar 2014 |

## Awards & Achievements

- Recepient of Ansellmo J. Macci fellowship at UC Berkeley — 2015-16
- Awarded the Best Internship Project at Samsung Global Research HQ for SoC design and optimization, suwon, South Korea — June 2014
- Indian delegate at the annual Winter School organized by the Institute of Theoritical Computer Science and Communications, CUHK, Hong Kong — Jan 2014
- Gold Medalist at Indian National Physics Olympiads (INPhO) and Indian National Chemistry Olympiads (INChO). Qualified for Orientation Cum Selection Camp for the International Physics and Chemistry olympiads (IChO, IPhO), held at BARC, India — July 2011
- Secured All India Rank 14 in the Joint Entrance Examination for Indian Institutes of Technology (IIT-JEE). Ranked 1st in Kanpur Zone — Apr 2011
- All India Rank 3 in the National Science Olympiads and All India Rank 4 in the International Mathematics Olympiads organized by Science Olympiad Foundation — Mar 2010
- Felicitated by former President of India, Dr. A. P. J. Abdul Kalam for excellence in Academics at Rashtriya Indian Military College, Dehradun, India — Apr 2009

## Extra-Curricular Activities

- Silver Medalist in Hockey at Inter IIT Sports Meet held at IIT Kharagpur (Dec 2012).
- Awarded Institute Special Mention, for contribution to sports at IIT Bombay in 2012-2013
- **Institute Hockey Secretary** (2013-14): Member of the Institute Sports Council at IIT Bombay. Organized and conducted Inter-Hostel hockey championships, trials and selection of Institute teams, acquiring and managing equipment and infrastructure.