

Ishwar Suriyaprakash

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EDUCATION

UC, Berkeley, B.A. Computer Science + Applied Mathematics (ML focus) GPA: 4.0 / 4.0 2024-2028

Honors to Date (Fall 2025, Spring 2025, Fall 2024)

Dean's List (College of CDSS, Fall 2025; College of L&S, Spring 2025)

Fall 2026 Courses: Computer Architecture / Machine Structures, Machine Learning, Signals & Systems

Planned (Spring 2027): Digital Design & Integrated Circuits, Deep Learning, Reinforcement Learning

Prior Courses: Optimization Models in Engineering, Probability for Data Science, Data Structures, Structure & Interpretation of Computer Programs, Abstract Linear Algebra, Linear Algebra & Differential Equations, Honors Abstract Algebra, Real Analysis

Directed Reading Program: Representation Theory (Fall 2025)

WORK EXPERIENCE

Hardware Intern, System Technology, Apple

Jan 2026 – Aug 2026

- Developed ML methods for constrained placement of 500–1,000 decoupling capacitors across ~100 Mac power rails, evaluated using 4 metrics covering placement legality, ground-truth proximity, and area utilization.
- Explored two different formulations of this problem and designed complementary approaches: (1) attention-GNN diffusion model for simultaneous placement and (2) a 3-CNN ensemble for sequential placement.
- Developed a pipeline: Cadence Allegro → dataset extraction → model training → placement generation → evaluation, supporting both ML approaches.

Physical Design Intern, Machine Learning for Physical Design, Tenstorrent

May 2025 – Aug 2025

- Developed & integrated a dynamic IR-drop solver in an ML pipeline for power delivery network (PDN) generation for IR-drop-aware routing congestion reduction. Optimized dynamic IR-drop solver by leveraging current-waveform periodicity, peak structure, & parallelization, making closed-loop PDN optimization feasible.
- Evaluated ML-generated and human-designed PDNs using Ansys RedHawk-SC for IR drop and integrated custom PDNs into place-and-route flows with Tcl, achieving zero insertion violations.

RESEARCH EXPERIENCE

Research Intern, UC Berkeley

Advisor: Prof. Alexander Strang

Jan-Aug 2026

- Developed data-driven methods for predicting payoff functions in symmetric games.
- Trained & evaluated MLP-based models and compared predictive behavior across different games such as Pokémon, Colonel Blotto, Iterated Prisoner's Dilemma, Kuhn, and Rock-Paper-Scissors.

Research Intern, Arizona State University

Advisor: Prof. Vidya Chhabria

2022-2024

- Developed voltage-aware static timing analyzer to model IR-drop-induced delay variation in digital circuits.
- Developed iterative and ML-based methods for PDN congestion reduction under IR-drop & timing constraints.
- Automated generation of synthetic Verilog netlists for model training and design-space experimentation.

SELECTED INDEPENDENT PROJECTS

- [Accelerated library cell characterization](#) for digital logic design using simulation-assisted machine learning.
- Developed U-Net & Transformer models to identify landmark points on RC simulator aircraft images.
- Explored autoencoders and GANs for grouping & generating music.
- [Quantified finger fatigue](#) by frequency domain analysis of time series electromyography signals from muscles.
- Developed semantic search for related-word & usage-trend queries using Google NGram, WordNet, hash maps, and directed graphs.

SKILLS

Hardware: Static Timing & PDN/IR-drop Analysis, Cadence Innovus/Allegro, RedHawk-SC, OpenROAD, NGSPICE

Machine Learning / Numerical Computing: PyTorch, PyTorch Geometric, TensorFlow, scikit-learn; GNNs, Transformers, CNNs, U-Net, RNNs, MLPs, Diffusion Models, Autoencoders, GANs/WGAN; SciPy, scikit-umfpack

Languages / Scripting: Python, C++, Java, Linux Shell, Tcl, SQL, MATLAB, Scheme, Cadence SKILL

Agentic Development: Claude Code, Cursor; custom Claude Skills for workflow automation

Optimization: Linear Programming, SVD, Convex Optimization, Simulated Annealing, Metropolis-Hastings

PUBLICATION & HONORS

- I. Suriyaprakash and G. Burroughs, "[DeepSPICE: Accelerating Digital Cell Characterization Using Deep Learning.](#)" *Journal of Student Research*, Vol. 11 No. 3 (2022).
- Putnam top 13.2% (2025), top 20.5% 2024); USA Physics Olympiad Bronze Medal (2023), Honorable Mention (2024); 4X AIME Qualifier (2020-24)
- Intel Andy Grove Scholarship, 2026–27

SELECTED ACADEMIC PROGRAMS

- Quantum Field Theory for Math Students, UC Berkeley ([Expository paper](#)) Spring 2025
- Canada/USA Mathcamp, Champlain College Summer 2023
- Ross Mathematics Program, Ohio Dominican University (Expository Paper: [Unique Factorization](#)) Summer 2022
- Euler Circle Summer 2021
- Combinatorial Game Theory (Expository Paper: [Classical Impartial Games](#))
- Combinatorics (Expository paper: [Catalan Objects](#))

TEACHING, MENTORING & OUTREACH

- Problem Writing & Outreach Team Member, [Berkeley Math Tournament](#) Fall 2025
- Math tutor at [schoolhouse.world](#), an international platform for peer-to-peer tutoring 2022-2024
- Student Tutor for Precalculus class, Homestead High School 2022-2023
- Teaching Assistant for Precalculus class, Homestead High School 2021-2022