# Ishwar Suriyaprakash

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## EDUCATION

**University of California, Berkeley, B.A. Computer Science + Applied Mathematics (ML focus)** 2024-2028
**GPA**: 4.0 / 4.0 *Dean's List – Fall '25, Spring '25*
Fall 2026 Courses: Computer Architecture / Machine Structures (RISC V), Machine Learning, Signals & Systems
Planned (Spring 2027): Digital Design & Integrated Circuits, Operating Systems
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 – Representation Theory

## WORK EXPERIENCE

**Hardware Intern, System Technology, Apple** Jan 2026 – Aug 2026
- Developed machine learning methods for constrained placement of decoupling capacitors across Mac power rails, and evaluated with 4 metrics for placement legality, ground-truth proximity, and area utilization.
- Designed two placement approaches: (1) attention-GNN diffusion for simultaneous placement and (2) a 3-CNN ensemble for sequential placement.
- Developed software pipeline, Cadence Allegro → dataset extraction → model training → placement generation → evaluation, supporting both machine learning 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; Enhanced place-and-route flow using Tcl to enable legal insertion of custom PDNs.

## RESEARCH EXPERIENCE

**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.

**Research Intern, UC Berkeley** **Advisor:** Prof. Alexander Strang. Jan 2026 - present
- Developed rule-agnostic MLP models and training/evaluation pipeline to learn symmetric-game payoff structure from gameplay data within a visually interpretable framework.

## SKILLS

**Hardware:** Static Timing & PDN/IR-drop Analysis, Innovus/Allegro, RedHawk-SC, OpenROAD, Verilog, NGSPICE
**Machine Learning / Numerical Computing:** PyTorch, PyTorch Geometric, TensorFlow, SciPy, scikit-learn, scikit-umfpack; Graph Neural Networks, Transformers, CNNs, U-Net, RNNs, MLPs, Diffusion Models, GANs
**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, Convex Optimization, Simulated Annealing, Metropolis-Hastings

## 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
- 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
- Grouping & generating music using autoencoders and generative adversarial networks

## PUBLICATION & HONORS

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