

Ishwar Suriyaprakash

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Education and Relevant STEM Coursework

University of California, Berkeley	2024-2028
Double major: Computer Science, Applied Math (with focus in Data Science) (GPA: 4.0 / 4.0)	
Fall '25: Abstract Algebra (MATH H113), Intro to Real Analysis (MATH 104), Optimization Models in Engineering (EECS 127)	
Spring '25: Abstract Linear Algebra (MATH 110), Data Structures (CS 61B), Probability for Data Science (DATA C140), Quantum Field Theory (Math 198 DeCal)	
Fall '24: Linear Algebra & Differential Equations (MATH 54), Structure and Interpretation of Computer Programs (CS 61A), Introduction to Quant Finance (IEOR 198 DeCal)	
Homestead High School (HHS) (CEEB: 053462), Cupertino, CA (GPA: 4.0 / 4.0)	2020-2024
AP Calculus BC, AP Computer Science, AP Physics C: Mechanics, Computer Programming Java, AP Statistics, AP Chemistry	
Skyline College , San Mateo, CA (concurrent with high school) (GPA: 4.0 / 4.0)	2023-2024
Introduction to Data Science (DATA C8), Ordinary Differential Equations	
Laney College , Oakland, CA (concurrent with high school) (GPA: 4.0 / 4.0)	2022-2024
Discrete Math, Linear Algebra, Multivariable Calculus	

Work Experience

Intern, Machine Learning for Physical Design, Tenstorrent	June 2025 – Aug 2025
<ul style="list-style-type: none">Developed and integrated a dynamic voltage-drop solver (Python) in OpeNPDN machine learning flow to generate routing-optimal power grid templates that satisfy dynamic voltage-drop constraints.Assessed voltage-drop within an integrated circuit module for different power grid configurations (including OpeNPDN-generated templates) using Ansys Redhawk tool.Improved OpeNPDN template integration into place-and-route flows with TCL automation that eliminates wire shorts between abutting templates.	

Mentored Research

Research intern, Arizona State University	Advisor: Prof. Vidya Chhabria	2022-2024
<i>Developed a machine learning method to perform voltage-and-timing-aware reduction of power delivery network (PDN) congestion to reduce turnaround time in the design of digital integrated circuits</i>		
<ul style="list-style-type: none">Developed voltage-aware static timing analyzer in Python & showed that PDN resistances increase circuit delay by 10.4%Wrote an iterative algorithm to reduce PDN congestion while meeting voltage-aware delay constraintsAutomatically generated several Verilog netlist benchmark circuits for MLInvestigated accelerating reduction of PDN congestion using convolutional neural network method		

Computer Skills

Languages: Python (42K lines of code), C++ (38K lines of code), Java, Linux Shell, Tcl, SQL.
Data structures: binary search trees, red-black trees, disjoint sets, hash tables, min heaps, tries, segment trees.
Algorithms/Paradigms: Recursion, stable & unstable sorts, graph algorithms, range queries.
Object-Oriented Programming: Java, Python. **Coding tools:** Git, JUnit, Cursor.
Machine Learning (ML) Libraries: PyTorch, TensorFlow, Scikit-Learn; **ML Algorithms:** regression, classification, unsupervised learning; **Neural Network Architectures:** Deep Neural Networks, Convolutional Neural Networks, U-Nets, Autoencoders, Generative Adversarial Networks (GANs), Wasserstein GANs, Recurrent Neural Networks.
VLSI Design: Digital design flows (OpenROAD, Cadence Innovus), Circuit Simulation (NG-SPICE), Static Timing Analysis, Artificial Netlist Generator, IR Drop (Ansys Redhawk).

Independent Projects (implemented in Python)

- [Accelerated library cell characterization](#) for digital logic design using simulation-assisted machine learning
- Performed music analysis using deep learning with autoencoders and generative adversarial networks (in progress)
- Investigated prediction of stock prices via periodic trend analysis using fast Fourier transform (IEOR 198 final project)
- Developed U-Net heatmap regression model to identify landmark points on RC simulator aircraft images
- Developed an interpreter for the Scheme programming language (CS 61A class project)

- Developed a k-means clustering algorithm to group people with similar interests
- Developed a k-nearest-neighbors classifier to predict movie genre based on word content (DATA C8 class project)
- Developed a two-player dice game simulator implementing multiple intelligent strategies (CS 61A class project)
- Developed a multiplayer typing game with integrated autocorrect (CS 61A class project)
- Developed a tower-defense game using Object Oriented Programming (CS 61A class project)
- Developed a simulator to render elastic collisions of objects and gravitational orbits of multiple planetary bodies
- [Quantified finger fatigue](#) by frequency domain analysis of time series electromyography signals from finger muscles
- [Identified household light sources that most affect sleep](#) by analyzing their spectral intensities

Publications

I. Suriyaprakash and G. Burroughs, "[DeepSPICE: Accelerating Digital Cell Characterization Using Deep Learning](#)", *Journal of Student Research*, Vol. 11 No. 3 (2022) (published [here](#)).

Enrichment Courses and Programs

Math 198, UC Berkeley (Expository paper)	Spring 2025
<ul style="list-style-type: none"> • Introduced to Quantum Field Theory and relevant topics, including Representation Theory and Category Theory. 	
Canada/USA Mathcamp, Champlain College	Summer 2023
<ul style="list-style-type: none"> • Studied topics including Infinite Arithmetic, Ramsey Theory, Cooperative Game Theory, Erdos' probabilistic method, Complex Analysis, and Elliptic Functions through daily classes and problem sets • Learned about Evasiveness of Graph Properties through a literature survey in a mentored project on theoretical computer science. 	
Ross Mathematics Program, Ohio Dominican University (Expository paper: Unique Factorization)	Summer 2022
<ul style="list-style-type: none"> • Delved into Algebraic & Analytic Number Theory: Euclidean domains, continued fractions, quadratic reciprocity, Diophantine equations, finite fields, Dirichlet series • Developed proof-writing and collaborative problem-solving abilities through daily lectures and series of problem sets. 	
Olympiad Physics Level 3, AwesomeMath Academy	Winter 2023
Worldwide Online Olympiad Training (WOOT), Art of Problem Solving (AoPS)	8/2021-2/2022
Euler Circle	Summer 2021
<ul style="list-style-type: none"> • Combinatorial Game Theory (Expository paper: Classical Impartial Games) • Combinatorics (Expository paper: Catalan Objects) 	
Topics including Algebraic Topology & Graph Theory, Stanford Math Circle	Spring 2021

Relevant Achievements

Scored 13 (top 20.5%) in Putnam Exam	2024
4X American Invitational Mathematics Examination (AIME) Qualifier	2020-2024
Distinction in American Mathematics Competition 12 (AMC 12)	2022
2X Honor Roll in American Mathematics Competition 10 (AMC 10)	2020-2021
USA Physics Olympiad Semifinalist, Honorable Mention	2024
USA Physics Olympiad Semifinalist, Bronze Medal	2023
USA Physics Olympiad Qualifier	2022
USA Computing Olympiad Silver Division Qualifier (C++)	2019

Leadership & Mentoring

HHS Math Club: President ('23-'24), Vice President ('22-'23), Activities Director ('21-'22)
Led enrollment drive and increased club participation by 2.5X; Introduced out-of-curriculum ideas such as combinatorics and game theory; delivered lectures on Retrograde Analysis, Catalan Objects, and Generating Functions. Arranged guest talks on geometric constructability and algebraic geometry. Coached and facilitated participation in AMC & AIME.

HHS Computer Science Club: Vice President ('23-'24), Workshops Director ('22-'23), Competitions Director ('21-'22)
Introduced extracurricular computer science ideas: led tutorial and group project on Cryptography, delivered workshops on topics including K-Means Clustering, Autoencoders, Topological Sort algorithm. Led Python workshop at Homestead Hacks hackathon for middle schoolers. Arranged guest talk on fairness in machine learning. Shared weekly algorithmic programming challenges.

Community Service

Tutor at schoolhouse.world , an international platform for peer-to-peer tutoring	2022-2024
AVID Tutor for Homestead High School seniors	2023-2024
Student Tutor for Precalculus class at Homestead High School	2022-2023
Teaching Assistant for Precalculus class at Homestead High School	2021-2022