

# Sanjit Dandapanthula

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*ML researcher passionate about creating theoretically principled models to solve hard practical problems.*

## EDUCATION

### Carnegie Mellon University

*Ph.D. in Statistics and Machine Learning (in progress)*

Pittsburgh, PA

Aug. 2024 –

### University of California, Los Angeles (UCLA)

*M.A. in Applied Mathematics (GPA: 3.92 / 4.00)*

*B.S. in Mathematics w/ highest honors, minor in Data Science and Engineering*

Los Angeles, CA

Apr. 2023 – Mar. 2024

Sep. 2020 – Mar. 2023

## TECHNICAL SKILLS

**Languages:** Python, C/C++, Rust, JavaScript, Haskell, Java, MATLAB, R, SQL, Bash, LaTeX

**Technologies:** PyTorch, TensorFlow, CUDA Spark, Hadoop, Ray Tune, Git, AWS, numpy, sklearn, pandas

**Expertise:** ML/AI, deep learning, NLP, high-performance computing, big data, algorithm design, optimization

## EXPERIENCE + RESEARCH

### Narya.ai ([The Mumble App](#) 🗣️)

*Lead Machine Learning Engineer*

San Jose, CA

May 2024 – Aug. 2024

- **AI Note-Taking:** Managed entire ML pipeline for new AI note-taking app in a fast-paced startup environment.
- **State-of-the-art LLMs:** Fine-tuned latest LLM models (GPT-4o, Llama 3.1 405B, Claude 3.5 Sonnet, Perplexity APIs) for efficient voice-based editing, re-writing, finding keywords, and search indexing on user notes.
- **Transcription:** Used Google's WebRTC-VAD model to reduce transcription hallucination during silence in audio.
- **Vision RAG:** Wrote retrieval-augmented generation model to find link to original social media post or article given a user screenshot, or do other helpful contextual research using real-time information from the Internet.
- **LLM Privacy:** Ported many fine-tuned open-source models to Apple CoreML to use private on-device LLMs.

### Institute for Pure and Applied Mathematics (IPAM)

*ML Research Intern + Project Manager*

Los Angeles, CA

Jun. 2023 – Sep. 2023

- **Game-Playing Algorithms:** Led a team of 4 researchers using techniques from nonlinear dynamical systems to develop patented game-playing AI algorithms for Pong, Pac-Man, and the Nvidia Omniverse twin world.
- **Particle Methods for AI:** Trained a network using a new particle-type Monte Carlo tree search to solve the cart-pole problem in 10 seconds (roughly 30x faster than a state of the art deep Q-network).
- **High-Performance Computing:** Wrote low-level systems code in Rust to implement multi-threading and used the CUDA platform to enable fast GPU-level concurrency.

### David Harold Blackwell Summer Research Institute (DHBSRI)

*ML Research Intern (under Dr. Jelani Nelson – UC Berkeley EECS)*

Berkeley, CA

Jun. 2022 – Sep. 2022

- **Algorithm Development:** Developed new algorithms to solve the learning-augmented sorting problem in Levenshtein distance,  $\ell_\infty$ -normed, and  $\ell_2$ -normed metric spaces and wrote a paper proving their optimality.

### UCLA Math 199: Directed Research

*Research Intern (under Dr. Rishi Sonthalia)*

Los Angeles, CA

Jan. 2022 – Apr. 2022

- **Optimization Algorithms:** Modified the Project-and-Forget algorithm for metric-constrained optimization to solve mixed-integer linear programs using Gomory cuts and branch-and-bound methods.

### Polymath REU

*Research Intern (under Dr. Zoran Šunić)*

Seattle, WA

Jun. 2021 – Sep. 2021

- **Computational Graph Theory:** Led a 10-person team's [programming efforts](#) to conjecture and prove recurrence relations describing the spectra of Schreier graphs of self-similar groups, which I solved explicitly.

## PROJECTS

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**Technical blog:** Created a [website](#) discussing solutions to interesting math problems and personal ML projects.

**NLP + Transformers:** Fine-tuned the [BERT](#) transformer model on the [SST-2](#) dataset for sentiment analysis.

**Deep RL:** Trained an [AI agent](#) to play Ashta Chamma using a deep Q-network with genetic-style training.

**WaveGAN:** Implemented [WaveGAN](#) as described in a 2018 paper to generate more audio in the style of an input.

**Dimensionality Reduction:** Wrote a [paper](#) benchmarking various dimensionality reduction techniques, including MDS, Isomap, Diffusion Maps, and UMAP.

**Blockchain:** Implemented a [distributed ledger system](#) using blockchains and SHA-256 hashing for checksums.

## CONFERENCE PRESENTATIONS

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**Joint Mathematics Meetings (2023):** Particle methods can improve Monte Carlo tree search for game-playing.

**Simons Institute for the Theory of Computing (2022):** New algorithms and optimality results for the learning-augmented sorting problem in assorted metric spaces.

**Joint Mathematics Meetings (2021):** Explicit formulas for the spectra of Schreier graphs of self-similar groups.

## AWARDS

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**UCLA Departmental Scholar Award (2023):** Passed UCLA's Basic Qualifying Exam for PhD students in math.

**Putnam Exam Top 500 Scorer (2021):** Scored in the top 500 nationally for the Putnam Exam in mathematics.

**National Merit Scholar (2020):** One of 8,000 students (out of 1.6 million applicants) to be awarded the scholarship.

## TEACHING

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**CMU 36-700 TA (Fall 2024):** Teaching assistant for an introductory graduate course in mathematical statistics.

**ORMC Lead Instructor (2022-2024):** Lead instructor for the Advanced I section at the Olga Radko Math Circle.

## EXTRACURRICULARS

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**Crisis Counselor - Crisis Text Line:** I'm a trained volunteer providing counseling to people at risk of suicide.

**Flutist:** I've been playing Indian classical music (Carnatic style) on the bamboo flute for the last four years.

**Endurance sports:** I run marathons (26.2 miles), bike long-distance (200+ miles), and hike beautiful glacier mountains.