Arnav Dandu

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Education

University of California San Diego   **August 2022 − June 2026**
B.S. Computer Science, B.S. Mathematics   *La Jolla, CA*

Relevant Coursework:

- **Computer Science:** quantum computing, programming language theory, data structures and algorithms, complexity theory, computer vision, computer graphics, computer architecture
- **Mathematics:** linear algebra, numerical analysis, probability, vector calculus, differential equations, discrete math, abstract algebra, real analysis, graph theory, combinatorics

Honors:

ServiceNow Scholar

- Among nine undergraduates at the Jacobs School of Engineering at UCSD selected as recipients of the ServiceNow scholarship.

Experience

Programming Systems Group, UC San Diego   **February 2025 − Present**
Undergraduate Researcher

- Formalizing a flexible and efficient algorithm for grammar-constrained decoding with the Lean proof assistant.
- Guarantees reliable structured text generation in LLM output for tasks such as code synthesis.

Department of Mathematics, UC San Diego   **September 2024 − Present**
Undergraduate Researcher

- Contributing to the formalization of advanced mathematical theorems in the Lean proof assistant.
- Formalizing the Auslander–Buchsbaum theorem in commutative algebra for integration into the mathlib library.

IBM Accelerate   **June 2024 − July 2024**
Research Track

- Participant in the research track of IBM Accelerate, exploring innovations in AI, semi-conductors, and quantum computing.
- Participated in workshops and seminars to further knowledge in various IBM research areas.

Aesthetic   **October 2023 − March 2024**
Machine Learning Engineer Intern

- Fine-tune CLIP embedding models to improve domain-specific vector search accuracy.
- Implement multimodal AI models to extract outfits from images using image segmentation.
- Fine-tune diffusion models with Dreambooth and LoRA to generate photorealistic portraits of users in various fashion styles.

CuraStone Corp.   **August 2023 − January 2024**
Research Scientist Intern

- Developed a LangChain-based tool to generate study materials from user provided textbooks and notes.
- Conduct comprehensive literature reviews and research on state-of-the-art AI/ML technologies.
- Led development of novel multimodal AI models to process domain-specific video content for efficient and accurate summarization.

Skills

- **C/C++, Python, Java, C#, Haskell, LaTeX**
- **Formal Methods** with **Lean** and **Coq**
- **Deep Learning** with TensorFlow and PyTorch
- **Parallel Computing** with NVIDIA CUDA
- **Graphics Programming** with OpenGL
- **Quantum Computing** with Qiskit

Projects

Type Theory for Quantum Computing - *link* | *quantum computing, type theory*

- Explores a foundation for writing provably correct quantum programs through linear dependent type theory. Produced as an expository resource for CSE 291 while providing a proof of no-cloning in the proposed framework.

Ray Tracer | *computer graphics, C++*

- Ray tracer written in pure C++, complete with custom matrix multiplication library. Produces ray traced image given scene description. Utilizes bounded volume hierarchy to accelerate scene rendering.

Service

Teacher | *UCSD Engineering Outreach*

- Created and taught lessons on important computer science topics such as cryptography to students in underprivileged elementary, middle, and high schools in the San Diego area with the hope of sparking interest in the next generation of engineers.