

Archit Patil

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EDUCATION

University of Texas at Austin

Austin, TX

B.S. Computer Science (Turing Scholars), Mathematics, Computational Biology; GPA: 3.75

Aug 2024 – May 2028

TECHNICAL SKILLS

Languages/tools: Python, C++, C, Java, JS, SQL, Verilog, ARM/x86 Assembly, PyTorch, TensorFlow, React, Node.js

Domains: Algorithms, Systems, ML Infrastructure, Private Computation, Unconventional Computing, Bioinformatics

EXPERIENCE

Moncrief Computational Genomics Engineering Intern

May 2026 – Present

Oden Institute For Computational Sciences

University of Texas at Austin

- Constructed private genomic sequence models achieving 89% accuracy on splice-site, promoter, and OCR tasks.
- Designed spacer-independent IRF algorithm, reducing computational complexity from $O(\text{spacer length})$ to $O(1)$ for specific repeat ranges, yielding over 50x processing time improvement.

Undergraduate Researcher

May 2025 – Present

Professor David Soloveichik

University of Texas at Austin

- First-authored DNA32 conference publication developing scalable Hilbert-basis algorithms for equilibrium analysis in DNA molecular computation, while also extending prior work to unsaturated systems.
- Reduced full enumeration to covering-design subproblems, achieving over 1000x speedup on large systems.

Undergraduate Course Assistant, CS311H Discrete Math (Honors)

Aug 2025 – Dec 2025

- Planned and graded assignments and led 10+ office hours for 50 students in sets, graph theory, and combinatorics.

Undergraduate Researcher

May 2025 – Aug 2025

Professor Vikas Pejaver

Icahn School of Medicine at Mount Sinai

- Processed 1M+ clinical notes to build a structured dataset mapping rare diseases for downstream analysis.
- Delivered 85% AUC identifying patients with rare diseases from MIMIC database using BERT-based pipeline.

PROJECTS

Ear-EEG Pain Monitoring with Foundation Models (Python, PyTorch)

Jan 2026 - May 2026

- Evaluated 3 EEG foundation models for pain detection using full-EEG vs. wearable ear-EEG channel setups.
- Developed channel-perturbed Tent-LCC test-time adaptation, enhancing cross-subject pain accuracy by 20.6%.

Operating Systems Implementation (C++, Assembly)

Aug 2025 - Dec 2025

- Built a multi-core preemptive kernel, eliminating race conditions and memory leaks across 1K concurrent threads.
- Implemented virtual memory, file systems, process isolation via user programs and 25+ system calls.
- Led a 4-person final project to implement graphics subsystem for OS capable of running multiplayer DOOM.

Game Boy Emulator (C++)

Apr 2025

- Built SDL2 Game Boy emulator with SM83 CPU, memory-mapped I/O, sprite/background rendering, and input.
- Streamlined event loop and Picture Processing Unit (PPU) to achieve 60 FPS and compatibility across ROMs.

Pipelined RISC Processor (Verilog)

Mar 2025

- Designed and programmed a 5-stage pipelined 16-bit RISC processor in Verilog; resolved data/control hazards and integrated instruction forwarding to reduce CPI.

Postpartum Hemorrhage (PPH) Cup | Patented Solution

Nov 2021 – Mar 2024

- Engineered a patented PPH cup to quantify maternal blood loss in real time, reducing error from 100% to 5%.
- Expanded deployment scope from initial prototype to 39 hospitals across India, reducing maternal mortality by 50% in critical care by enabling precise blood loss measurement and rapid response.

HONORS

JEE - Indian Institute of Technology (IIT) Entrance examination

Feb 2024 – May 2024

- Achieved All India Rank 53 in **JEE Mains** and Rank 160 in **JEE Advanced** among 1.2 million candidates.

International Olympiads

Nov 2022 – Mar 2024

- Achieved top 1% nationally in India in Physics, Astronomy, and Chemistry Olympiads (2023–2024).