Tanay Bhardwaj

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Education

University of Illinois Urbana-Champaign — Urbana-Champaign, IL
Bachelor of Science in Computer Engineering — *August 2025 – May 2029*

Experience

Undergraduate Research Assistant — May 2026 – Present
American Institutions & Methodology (AIM) Lab, The Ohio State University — *Columbus, OH*

- Engineered the data pipeline for a quantitative study testing whether news coverage influences which cases the US Supreme Court agrees to hear, assembling decades of newspaper coverage to link media attention to certiorari decisions.
- Built an end-to-end news-collection pipeline (Python, Selenium, Gemini API) that converts a list of 42 issue areas into 45 boolean ProQuest queries, automating a JavaScript-heavy portal to scope 1.4M+ articles to English-language US newspapers from 1985 to 2026.
- Designed a two-stage relevance funnel pairing broad server-side queries with an LLM filter, batching headlines and snippets through the Gemini Batch API (gemini-3.5-flash); validated on a 100-article pilot that de-duped to 94 and classified 79 as case-specific with perfect accuracy.

Webmaster — June 2026 – Present
IEEE Student Branch, University of Illinois Urbana-Champaign — *Urbana-Champaign, IL*

- Leading an in-progress redesign of the student branch website using Next.js and TypeScript.

Projects

REASON: Reasoning Engine for Analysis of Screening Outcomes in Genomics — October 2025
3rd Place, 2025 Ashby Prize in Computational Science Hackathon — *Urbana-Champaign, IL*

- Built REASON with two teammates, an LLM-based reasoning engine predicting CRISPR knockout screening outcomes via prompt engineering on synthetic BioGrid data and GRPO reward-based fine-tuning.
- Deployed Qwen-3 4B and 8B with vLLM and DeepSpeed on 8x H200 GPUs (NCSA Delta), achieving F1 scores of 0.388 and 0.450 respectively versus a ChatGPT baseline of 0.35 (11% and 29% improvement).
- Designed a 5-shot prompting and evaluation pipeline showing targeted prompt design plus domain fine-tuning can beat larger general-purpose models on specialized tasks.

lc3vm: LC-3 Virtual Machine in OCaml — May 2026
Personal Project — *OCaml, Dune, Alcotest*

- Built an LC-3 virtual machine in OCaml that loads big-endian .obj files and executes all 15 LC-3 opcodes across arithmetic, control flow, memory access, and trap operations in under 400 lines of source code.
- Structured the codebase into separate machine, decode, exec, and loader modules following a fetch-decode-execute pipeline, with 16-bit masking and sign extension enforced at module boundaries so the executor never needs to handle overflow.
- Added an instruction-level trace mode for debugging and wrote an Alcotest unit test suite covering sign extension, register and memory I/O, condition codes, instruction decoding, executor behavior, and loader error cases.

Technical Skills

Languages: Python, C, C++, OCaml, Verilog, SQL, TypeScript, JavaScript
Frameworks: PyTorch, vLLM, DeepSpeed, Next.js, React, Node.js, FastAPI
Tools: Linux, Git, Docker, LaTeX, KiCad