Tran Khanh Thanh

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Education

Vin University **Hanoi, Vietnam**
Bachelor of Science in Electrical Engineering - GPA: 3.7/4.0 *Class of 2029*

Honors And Awards

Vietnam AI Contest 2024 **VLAB Innovation & Boston Global Forum**
First Prize *Dec 2024*

FIRST Global Challenge 2023 - International Olympic Robotics Competition **FIRST Global**
Gold Medal for Finallist Winning Alliance *Oct 2023*

Work Experience & Current Projects

STEAM for Vietnam **April 2025 – Now**
Software Engineer

Robotics Tournament Management System **May 2025 – Now**
Bun, Electrobun, React, Hono, SQLite, TanStack Start, PostgreSQL, SSE, TinyBase

* Built a cross-platform desktop application for competition staff using TypeScript, Bun, Electrobun, React, Hono, and SQLite, compiled to a native single executable with a 30 MB build size and about 200 MB runtime memory footprint for simple one-click deployment.
* Implemented a LAN-based local HTTP server so all operators on the same network can connect simultaneously without internet dependency, scaling from a single-user setup to full-venue operations.
* Delivered real-time multi-user editing with Server-Sent Events (SSE) and TinyBase for optimistic local state, maintaining sub-second client synchronization across concurrent updates during live match sessions.
* Designed core competition algorithms for scheduling, dynamic ranking computation, rule processing, and workflows across practice, qualification, and playoff phases, with audit trails for consistent rule enforcement.

StemFun: AI-powered text to code to video for Education **Feb 2025**
Manim, Langchain, FastAPI, AWS, Redis, Gradio, Docker

• Developed TheoremExplainAgent, an AI system that generates long-form Manim videos to visually explain mathematical theorems, enhancing understanding and identifying potential reasoning flaws.

• Designed and implemented a modular architecture, including video planning, code generation (with optional RAG integration), Manim rendering, and evaluation components, orchestrated by a central Python script.

• Integrated Large Language Models (LLMs) to automate the translation of theorem explanations into Manim code, and built an evaluation suite to assess video quality and provide feedback for system improvement.

Fast CFD — 3D Building Editor & ML-Accelerated CFD Simulation for HVAC **Feb - Mar 2026**
Three.js/WebGPU, Next.js 16, FastAPI, PyTorch, GiNOT, Docker,

* Developed an interactive drag-and-drop 3D building editor using React 19, Three.js/WebGPU, and Next.js 16, enabling users to construct multi-story HVAC layouts with 8+ component types and launch one-click CFD simulation with near real-time results.
* Built a high-performance FastAPI and PyTorch backend leveraging the GiNOT architecture to replace traditional CFD solvers, achieving about 1,000× faster inference with end-to-end mesh pipelines for STL/OBJ parsing, point sampling, normalization, model caching, and Dockerized REST APIs.
* Architected a Turborepo monorepo with 4 packages, implementing a dirty-node ECS rendering pipeline that reduced redundant geometry recomputation by about 95%, plus Zustand-based 50-step undo/redo, CSG Boolean operations, and spatial-grid collision detection for real-time design validation.

PRISM: A Multi-Dimensional Benchmark for Evaluating LLM Peer Reviewers **Sep 2025 - Now**
Research Project

* Developed a multi-dimensional benchmark to evaluate AI-generated peer reviews across 6 quality metrics, comparing 5 LLM baselines against human reviewers over 5 conference datasets.
* Designed an evidence-grounded evaluation pipeline for novelty assessment, flaw identification, issue prioritization, and constructiveness using retrieval-based verification and statistical validation.
* Performed Pearson correlation, Wilcoxon signed-rank, and Holm-Bonferroni analyses to show metric independence, quantify model-human gaps, and identify strengths of leading review-generation systems.