

# Sardor Nodirov

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## EDUCATION

### COLBY COLLEGE

Bachelor of Arts in Computer Science, AI concentration

Waterville, ME

Expected May 2026

- Presidential Scholar; Program GPA: 3.9/4.0
- Relevant Coursework: Neural Networks, Data Analysis & Visual., Comp. Archit., DSA, AI Ethics
- President of Colby College AI Society

### THE UNIVERSITY OF EDINBURGH

Study Abroad Program at The Schools of Electronics & Electrical Engineering and Informatics

Edinburgh, Scotland

Jan 2025 - May 2025

Relevant Coursework: Natural Language Processing, Quantum Computing, Embedded Systems

### TEMPLE UNIVERSITY JAPAN

Study Abroad Program with Coursework in Computer Imaging

Tokyo, Japan

Sep 2024 - Dec 2024

## RESEARCH PROJECTS

**Real-Time Human Motion Generation For VR Characters** | *Honor's Thesis* | **Demo:** [live.nodirov.com](https://live.nodirov.com) May 2025 – Present

- Implemented a kinematic retargeting pipeline to map BVH motion data to VRM humanoids in real-time
- Solved root motion drift and rotation artifacts using inertial blending heuristics, ensuring anatomically correct 60 FPS playback without foot-sliding
- Engineered a low-latency, non-blocking pipeline (asyncio/WebSockets) to synchronize concurrent LLM token streaming with TTS audio and BVH motion synthesis.

## WORK EXPERIENCE

### EMBER AI (Early-Stage Startup)

Founding Full-Stack AI Engineer (Contract)

San Francisco, CA (remote)

May 2024 – Nov 2024

- Engineered a **multi-modal** AI pipeline, using **state-of-the-art Vision Transformers** and LLMs to generate interactive, narrated memory experiences from user-uploaded raw images
- Architected a fault-tolerant, asynchronous generation backend utilizing **Redis** and **BullMQ** to handle high-concurrency generation queues
- Built a real-time playback engine with UI, achieving near-instant **<50ms** visual-audio sync latency across distributed clients.
- Optimized global asset delivery and storage costs by implementing Cloudflare **R2** with edge caching, reducing projected egress costs by 50% compared to standard S3 architecture.

### DAVIS INSTITUTE FOR AI | Research Poster: [poster.nodirov.com](https://poster.nodirov.com)

AI Research Assistant – Conversational Architectures

Waterville, ME

Sep 2023 – May 2024

- Architected a **real-time, full-duplex** voice agent achieving **sub-second** end-to-end latency by orchestrating an asynchronous FastAPI WebSocket pipeline with TTS and Azure Speech STT streams.
- Designed a **hybrid inference engine** optimizing for speed vs. reasoning; implemented **router logic** to dispatch complex queries to reasoning models and latency-sensitive chat to local OSS models, achieving 300+ tokens/sec throughput.
- Built a production-grade Retrieval-Augmented Generation (RAG) system; developed a custom Scrapy spider to vectorize **800+** institutional pages into **Qdrant**, enabling high-fidelity semantic search via Cohere embeddings.
- Engineered a custom audio buffering and barge-in protocol handling raw **mulaw/8000Hz** streams, enabling users to naturally interrupt the AI while maintaining conversation context and state consistency.

## SKILLS

**Languages:** Python (Advanced: asyncio, multiprocessing), Java, C, Rust, SQL, TypeScript, JavaScript,

**AI & Machine Learning:** PyTorch, Tensorflow, MoMask, MDM, Motion generation, Vector Stores & Embeddings, LLM Orchestration, Vision Transformers, Azure Speech Synthesis, Voice Cloning, Linear Algebra, Quaternions

**Real-time Systems:** WebSockets, WebRTC, Redis (BullMQ/Caching)

**3D Graphics & Standards:** Three.js, WebGL, BVH, VRM, Bone Retargeting, Root Motion

**Full-Stack Engineering:** Next.js, React 18, Node.js, FastAPI, Tailwind CSS, shadcn UI

**Infrastructure & Data:** Cloudflare R2/Workers, Firebase (Firestore), MongoDB, Docker, Git, CI/CD.

**Languages Spoken:** English, Russian, Uzbek, Japanese