

# Levi Neuwirth

CURRICULUM VITAE · Last updated April 2026

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## EDUCATION

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### Technical University of Denmark (DTU)

September 2026 – expected 2028 · Kongens Lyngby, Denmark

*MSc in Computer Science and Engineering.*

Primary advisor and research group TBD. Intended path toward PhD upon completion.

### Brown University

August 2022 – May 2026 · Providence, RI

*Sc.B., Mathematics and Computer Science. GPA 3.8/4.0.*

Primary undergraduate advisor: D. Ellis Hershkowitz (Computer Science). Primary research supervisor:  
Liqi Shu, MD (Neurology, Warren Alpert Medical School).

### DIS Copenhagen / Københavns Universitet

Fall 2024 · Copenhagen, Denmark

*Semester abroad.*

## RESEARCH EXPERIENCE

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### Shu Laboratory, Brown University Department of Neurology — Undergraduate Researcher and Technical Lead

October 2023 – Present · Providence, RI

Research with Dr. Liqi Shu spanning clinical machine learning, movement-disorder kinematic analysis, and claims-based outcome prediction. Two distinct research threads:

- Technical lead on **NeuroPose**, a 3D pose-estimation and kinematic-analysis system for neurological-recovery research. Built end-to-end pipeline: Python/TensorFlow deep-learning inference, MATLAB statistical post-processing, Rust backend with HTML/JS frontends. System supports four externally-funded sub-projects; clinical-implications manuscript in preparation.
- Co-lead developer on an **order-invariant ICD-10-CM embedding model** for 30-day readmission (AUC 0.75 vs 0.66 CCI baseline) and postdischarge mortality prediction (AUC 0.86 vs 0.78), Deep Sets architecture trained on 113M+ adult hospitalizations from the HCUP Nationwide Readmissions Database. Preprint under review at *JAMA Network Open*; public calculator deployed at levineuwirth.github.io.

### Brown University Center for Computation and Visualization (CCV) — Independent Researcher (HPC-supported)

March 2025 – Present · Providence, RI

- Micro-architectural study of SIMD contributions to lattice-based post-quantum cryptography (ML-KEM / Kyber) on x86-64 AVX2, conducted on Brown's OSCAR HPC cluster with staff support. Phase 1 released as a technical report (see Publications); Phase 2 (hardware performance counters, RAPL energy) and Phase 3 (cross-ISA: ARM NEON/SVE, RISC-V V) in progress.

## PUBLICATIONS AND PREPRINTS

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Equal-contribution undergraduate authors are marked with †.

**Shu L, Neuwirth L†, Wang X†, Zheng H†.** *Beyond Comorbidity Indices: An Order-Invariant ICD-10-CM Embedding for Readmission and Mortality Prediction.* Under review at *JAMA Network Open*. [Preprint] [Code] [Calculator] 2026.

**Neuwirth L.** *Where Does SIMD Help Post-Quantum Cryptography? A Micro-Architectural Study of ML-KEM on x86 AVX2.* Technical report, Brown University Department of Computer Science. [Report] [Artifact] 2026, April.

**NeuroPose clinical-implications manuscript.** In preparation. Shu laboratory, Brown University Department of Neurology. Target venue TBD, 2026–2027.

## PRESENTATIONS

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**Shu L, Neuwirth L†, Wang X†, Zheng H†.** *Order-Invariant ICD-10-CM Embedding for Readmission and Mortality Prediction: Toward Multimodal Generative Patient Models.* IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE), 2026. Submitted; under review.

**Ma J, Arms S, Kaneira L, Lall M, Chen K, Cabral W, Man D, Neuwirth L, Shu L.** *Early Detection of Neurological Disorders through Video-Captured Kinematic Analysis.* Poster presentation, Summer UTRA Symposium, Brown University / Rhode Island Hospital Neurology Department, August 2025.

## GRANTS AND AWARDS

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**Brown Undergraduate Teaching and Research Award (UTRA),** individual recipient. Summer 2024.

First funding awarded for NeuroPose; the work has since attracted three additional project-wide grants through the Shu laboratory.

**Graduate fellowship / admissions awards at DTU.**

Pending; updates as they land.

## RESEARCH AFFILIATIONS

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**NSF Award #2148451 — A Learning Ecosystem for Teaching High School Students Machine Learning Concepts and Data Science Skills in Healthcare and Medicine** — *Undergraduate mentor / research affiliate*

October 2023 – May 2025

Affiliated with an NSF-funded education research project studying how high-school students learn machine learning and data science concepts in a healthcare and medical context. Contributed in a college-student mentor capacity; not an author on the study's research outputs. Independent of the Shu laboratory research.

## SYSTEMS AND ENGINEERING PROJECTS

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**Weenix** *January 2025 – Present*. Full Unix-like kernel in 10,000 lines of C: virtual memory, VFS, system calls, threading, device drivers and interrupt handlers, and file systems with custom linker support for running userspace x86-64 ELF binaries. Brown CS 169.

**Networking Stack from Scratch** *October 2024 – July 2025*. TCP/IP, RIP, UDP, and DNS implementations in Go, supporting file transmission of up to 1 GB across networks of up to 8 virtual machines.

## INDUSTRY EXPERIENCE

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**xAI** — *Agentic Systems Intern*

May 2025 – August 2025 · Remote

Contributed to the training of `grok-code-fast-1`, xAI's agentic coding model (publicly launched August 2025).

- Architected LLM integrations into autonomous agent frameworks, orchestrating 20 tools across thousands of production workflows and codebases.
- Diagnosed and resolved 50+ agentic failures, lifting tool-execution success rates by 15%+, cutting fatal tool-usage errors by 40%+, and reducing API usage by 20%+.

**NeuroAI LLC** — *Research Engineer*

March 2026 – Present · [neuroai.health](https://neuroai.health)

Early-stage venture of academics and clinicians integrating deep learning, reinforcement learning, and generative AI into clinical and research workflows. Leading model development, deployment infrastructure, and system design.

## SELECTED CONTRACT WORK

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**Independent Research Contracting — Anthropic, OpenAI, Mistral**. 2025 – Present, as-needed.

Code and mathematics contributions for agentic workflow design, task evaluation, model safety, and red-teaming.

## LANGUAGES

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English native · Spanish C1 · Danish B1 · German A2 · Chinese (Mandarin) A2 · French A1.

## TECHNICAL SKILLS

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**Programming:** Assembly (x86-64, inline SIMD), C, C++, C#, Go, Java, JavaScript, Python, Rust.

**ML and AI:** PyTorch, TensorFlow, NumPy, Pandas, OpenCV.

**Tools and platforms:** Git, LaTeX, Linux (Arch, Debian, Gentoo), make, SLURM, perf, Docker.

## RESEARCH INTERESTS

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Artificial intelligence and machine learning; reinforcement learning; deep learning; clinical and biomedical ML; computer systems; cryptography; high-performance computing; computer vision; computer architecture; security