

Levi Neuwirth

CURRICULUM VITAE · Last updated August 2026

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EDUCATION

Technical University of Denmark (DTU)

September 2026 – expected 2028 · Kongens Lyngby, Denmark

MSc in Computer Science and Engineering.

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

Cambridge AI Safety Hub — MARS V Fellow

July 2026 – October 2026 · Cambridge, United Kingdom

- Selected for MARS V, a competitive part-time AI-safety research fellowship, working under James Petrie (Future of Life Institute).
- Research on zero-knowledge proofs for large language models, toward cryptographic verification of claims about model training, inference, and deployment.

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

October 2023 – May 2026 · 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 *JAMIA*; public calculator deployed at levineuwirth.github.io.

Shu Laboratory, Brown University Department of Neurology — Research Affiliate

May 2026 – Present · Providence, RI

Brown University Center for Computation and Visualization (CCV) — Independent Researcher

March 2025 – July 2026 · 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).

PUBLICATIONS AND PREPRINTS

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 *Journal of the American Medical Informatics Association (JAMIA)*. [Full text] [Code] [Calculator] 2026.

Neuwirth L. *Branch-Tube Persistence and Static Coverage in Tree-Ball Geometry.* Preprint. [Full text] 2026, July.

Neuwirth L. *The Annealed Critical Window for Growing-Radius Domination in Random Regular Graphs.* Preprint. [Full text] 2026, July.

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. [Full text] [Artifact] 2026, April.

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

PRESENTATIONS

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), August 2026. Presented.

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.

Neuwirth L, Dasher AS. *Proving What a Datacenter Did: Verified Inference Between Adversaries.* MARS V, Cambridge AI Safety Hub, July 2026. Presented.

GRANTS AND AWARDS

MARS V Fellowship, Cambridge AI Safety Hub, competitive selection. 2026.

Compute, travel, and accommodation provided.

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.

RESEARCH AFFILIATIONS

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

Not an author on the study's research outputs; independent of the Shu laboratory research.

SYSTEMS AND ENGINEERING PROJECTS

Weenix *January 2025 – August 2025*. 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. Originally Brown CS 169 (Operating Systems with Lab), extended afterward with pipes and userspace preemption.

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. Extended with a fully RFC-compliant SSH implementation (2,000+ additional lines) supporting sustained sessions of arbitrary length.

INDUSTRY EXPERIENCE

Independent Research Contractor — *Frontier AI labs*

2025 – Present

Code and mathematics contributions across agentic workflow design, task and capability evaluation, reasoning assessment, model safety, and red-teaming.

NeuroAI LLC

March 2026 – Present · neuroai.health

Early-stage clinical-AI venture. Leading model development and deployment infrastructure.

LANGUAGES

English native · Spanish C1 · German B1 · Danish A2 · French A1.

TECHNICAL SKILLS

Programming: Assembly (x86-64, inline SIMD), C, C++, C#, Go, Haskell, 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

AI safety; graph theory, number theory, and theoretical computer science; computer systems and high-performance computing; artificial intelligence and machine learning; reinforcement learning; deep learning; cryptography; computer vision; computer architecture; security; clinical and biomedical ML