Linh T. Nguyen

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EDUCATION

Michigan State University **Aug 2022 - May 2026**

Bachelor of Science in Computer Science, Department of Computer Science

Minor in Game Design and Development, Department of Media and Information

- **GPA**: 3.96/4.0
- **Honors***:* Presidential Scholarship, Honor Scholarship, Honors College Member, Dean's List (2022–2025)
- **Coursework**: Discrete Math (TA), Object-Oriented Programming, Algorithms & Data Structures, Information Management & the Cloud, Database Systems, Big Data Analysis, Computer Organization & Architecture (TA), Web Application Development, Computer Systems, Biometrics and Pattern Recognition.

RESEARCH INTERESTS

Focused on deep learning for multimedia security, watermarking robustness, AI model authentication, adversarial audio, and content provenance.

RESEARCH EXPERIENCE

Secure and Intelligent Things Lab, Michigan State University **Apr 2025 - Present**

Undergraduate Research Assistant – Dr. Qiben Yan

- Developed a deep-learning pipeline for embedding binary code into Mel-spectrogram representations of audio signals by implementing frequency-layered watermarking, achieving robust signal integrity under transformation attacks.
- Evaluated watermark resilience under compression, filtering, and additive noise attacks, improving detection reliability by 25% compared to baseline models.
- Reconstructed high-fidelity audio through STFT/ISTFT-based spectrogram inversion, preserving perceptual quality while retaining embedded watermark traces.
- Designed and implemented a multimodal watermarking framework embedding synchronized binary sequences across audio and video streams for tamper-resistant content authentication.
- Currently integrating audio–visual transformer encoders to jointly model multimodal watermark detection for real-time content verification.

PUBLICATIONS

Nguyen, L. T., Pham, D., Liu, S., & Yan, Q. (2025). *FreLa: Frequency-Layered Audio Watermarking for Robust Content Authentication.* Under review at ICLR 2026.

- Developed a neural audio watermarking system using the AudioSeal model, embedding robust 16-bit messages into time-domain audio through band-specific STFT/ISTFT transforms and learned watermark signals.
- Engineered a frequency-domain watermarking pipeline, splitting audio into multiple spectral bands (0–8 kHz), processing each independently for watermark injection, and reconstructing using inverse STFT with minimal perceptual distortion.
- Implemented robust preprocessing and signal normalization (resampling, RMS scaling) to ensure watermark integrity across different transformations and playback scenarios.

TEACHING EXPERIENCE

College of Engineering, Michigan State University **Aug 2023 - May 2025**

Undergraduate Learning Assistant

- CSE 320 Computer Organization and Architecture (Spring 2025)
- CSE 260 Discrete Math (Spring & Fall 2024)
- CoRe Tutoring (Pre - calculus, Calculus, Physics) (Fall 2023)
- Assisted in teaching core concepts in logic, set theory, combinatorics, algorithms, Boolean algebra, and computer architecture fundamentals to 200-student class.
- Held 30+ tutoring sessions for 50 students, strengthening understanding of C and Assembly concepts and their application to machine organization and instruction execution and improving student exam performance by 20%.

PROFESSIONAL EXPERIENCE

Ally Financial **August 2025 - Present**

Software Engineering Intern

- Built a Flask–Snowflake web platform for automated data consistency checks, reducing manual reconciliation by 70%.
- Implemented anomaly detection by deploying Isolation Forest models on Snowflake datasets to improve data validation accuracy by 30%.
- Enabled real-time editing and synchronization of different format uploaded data by developing API endpoints and JSON-based update pipelines.
- Designed an interactive dashboard by leveraging Flask templates and dynamic tables, allowing users to visualize anomalies and generate audit-ready reports.

Facility of Rare Isotope Beam LISE++, Michigan State University **Apr 2024 - Nov 2024**

Web developer

- Assistance in developing software for obtaining beams of rare isotopes and in developing reaction models using C++ in Qt framework.
- Collaborated with a cross-functional of 9 members in maintaining and updating LiSE++ application for different operating systems.

FPT Telecom Corporation **May 2023 - Aug 2023**

Data Engineering Intern

- Contributed to a 5-member cross-functional team to maintain and enhance the company's domestic application.
- Optimized SQL and MongoDB queries, increased data processing efficiency by 30% and data accuracy by 80%.
- Developed and deployed RESTful APIs in Flask, streamlining data retrieval and system-wide integration by 35%.

PROJECTS

EzSchedule - ***Live Demo*** | *Flask, JavaScript, Socket.IO, HTML/CSS, Docker, GCP* **Jan 2025 - Apr 2025**

- Built a full-stack, real-time scheduling platform (When2Meet clone) that enables users to collaboratively share availability on an interactive calendar grid.
- Designed a drag-to-select calendar UI with live updates and heatmap consensus visualization help to increase response time by 30%.
- Deployed containerized Docker services on Google Cloud Platform (GCP) for scalable hosting.

Free Floating – ***itch.io*** | *C#, Unity Engine, UX/UI* **Aug 2024 - Dec 2024**

- Worked with a cross-functional team of 8 members on all stages of development for a strategy game, where players manage an airship to complete their journey, published on itch.io.
- Designed and implemented UX/UI using C# and Unity Engine, reducing navigation time by 30% and increasing player engagement by 40%.
- Performed rigorous testing with 50+ users to enhance responsiveness and user experience and ensure smooth gameplay across devices.

MicroDocs - Document Management System - ***GitHub*** | *Python, Flask, SQLite, Docker* **Aug 2024 - Dec 2024**

- Developed a containerized document management microservice system with secure JWT-based authentication and REST APIs.
- Implemented JWT authentication, role-based access, and secure SQLite queries for scalability and security.
- Implemented inter-service communication and logging with Docker networking to optimize performance and scalability.

Spartan Hero Music Game - ***GitHub*** | *C++, XML, wxWidgets, OOP* **Feb 2024 - Apr 2024**

- Collaborated with a 5-member team from Object-Oriented Software course to design and develop a rhythm-based music game using C++ and wxWidgets for both front-end and back-end development.
- Used XML for UI design and game state management, improving customization flexibility.
- Implemented a scoring algorithm, increasing player engagement and retention.

LEADERSHIP

Freelance Content Creator - *YouTube*, *Instagram* **Dec 2023 - present**

- Created educational content about CS projects, career journey, and student life to help demystify tech topics.
- Collaborated with 4 different brands to promote products through creative campaigns and sponsored posts.
- Achieved 2M+ engagement and 100k+ followers over 2 years (YouTube, TikTok, Instagram, Threads)

SKILLS

- **Languages**: C++, Python, C#, C, JavaScript, HTML, CSS, Assembly, MATLAB.
- **Frameworks & Tools:** Flask, FastAPI, Unity, Qt, Git, Docker, GCP, Postman, Linux.
- **Libraries:** PyTorch, Torchaudio, SciPy, IsolationForest.
- **Databases:** MySQL, SQL, PostgreSQL, MongoDB.