

# 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

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### 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

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### 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

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- **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.