Thomas Lohman

tlohman@nd.edu | cell: 312-961-8862 | LinkedIn: thomas-lohman | Website: thomas-lohman.vercel.app

EDUCATION

The University of Notre Dame

Master of Science, *Computer Science and Engineering* | **Graduate GPA**: 3.90/4.0   **May 2025 – May 2026**
- Specialization: Machine Learning and Data Science
- Graduate CSE Coursework: Advanced Machine Learning, AI & Social Good, Large Language Model Practices
- Interdisciplinary MBA Coursework: Investment Theory, Equity Valuation, Options and Futures

Bachelor of Science, *Computer Science and Engineering* | **Undergraduate GPA**: 3.75/4.0   **Aug 2021 – May 2025**
- Minor: Engineering Corporate Practice | Study Abroad: London (June 2022 – August 2022)
- Relevant Coursework: Machine Learning, Corporate Finance, Intro To Accounting, Neural Networks, Database Systems
- Activities and Leadership: Club Volleyball, Student International Business Council, Volunteer Middle School Tutor, DataFest

INDUSTRY AND RESEARCH EXPERIENCE

Data Scientist – *NASA SADE (Safety Aware Drone Ecosystem)*   **Jan 2026 – May 2026**
- Developing a real-time data monitoring and analytics system to verify autonomous drone behavior and mission compliance in safety-critical airspaces.
- Analyzing operational and interaction data to identify deviations from expected behavior and potential safety risks.

Machine Learning for Transaction Cost Aware Portfolio Allocation – *Thesis Direction*   **Jun 2025 – May 2026**
- Implemented a transaction-cost-aware portfolio optimization approach based on existing academic methodology, using neural networks to map asset characteristics directly to portfolio weights.
- Applied the framework to historical equity data (CRSP dataset) to study how transaction costs affect portfolio turnover and risk-adjusted returns.
- Benchmarked results against standard mean-variance portfolios using net-of-cost performance metrics.

Network Analytics Research Intern – *Undergraduate Research ND CSE Department*   **Aug 2024 – Dec 2024**
- Created and analyzed social networks from a dataset of ~2.5 billion rows
- Developed a methodology for evaluating the similarity of publications to select networks for comparison

Data Science Intern - *1st Source Bank*   **Jan 2024 – July 2024**
- Developed new methods for classifying the bank's primary customers using over 15 years of customer data
- Created synthesized, time-aligned customer transaction datasets by normalizing activity histories across customer tenure to enable consistent longitudinal analysis.
- Built a logistic regression model predicting the classification of primary customers with over 85% testing accuracy

Technical Market Analyst Intern - *Idea Center Notre Dame*   **Aug 2023 – May 2024**
- Conducted market research to identify opportunities for the commercialization of professors' research and IP
- Created and presented reports summarizing market size, competitive landscape, and commercialization pathways.
- Synthesized technical and business considerations into clear narratives for decision-makers.

LEADERSHIP AND TEACHING

Generative AI Teaching Assistant - *ND CSE Department*   **Jan 2026 – May 2026**
- Guided students through a from-scratch implementation of a minimal ChatGPT-style language model, covering tokenization, transformer blocks, training loops, and inference.

Introduction to Artificial Intelligence Teaching Assistant - *ND CSE Department*   **May 2024 – May 2026**
- Assisted in the teaching of content including AI search algorithms, Bayesian statistics, Markovian models, basics of machine learning, and deep learning principles
- Lectured to over 100 students on topics including neural networks, backpropagation, clustering, and dimensionality reduction
- Hosted weekly office hours to aid students in course material comprehension and technical programming

Vice President (formerly Treasurer) - *ND Men's Club Volleyball*   **Aug 2022 – May 2025**
- Guided biweekly executive board meetings to coordinate travel and tournament logistics, practice plans, and budget reviews
- Budgeted and managed funds for ND men's club volleyball, raised over $11,000 dollars from 125+ donors in 5 days

PROJECTS

Abstract Art Analysis with Large Language Models – *LLM Engineering and Practices*   **Aug 2025 – Dec 2025**
- Evaluated multiple open-weight vision-language models on abstract art interpretation using zero- and few-shot ICL.
- Designed an evaluation framework measuring both emotion classification accuracy and semantic alignment of model-generated explanations with human annotations.
- Used embedding-based cosine similarity to compare model explanations against diverse human-written descriptions.
- Found that in-context learning provided negligible improvement over zero-shot performance and that models exhibited latent alignment comparable to human–human agreement in explanation generation.

Multimodal Generative System for Effective Language Learning – *Advanced Machine Learning*   **Jan 2025 – May 2025**
- Designed a modular multimodal AI system enabling open-ended, level-appropriate conversation for beginner Spanish learners
- Implemented token-level decoding constraints to restrict vocabulary and grammar to CEFR A2 standards while preserving conversational coherence.
- Integrated real-time English translation to support learner comprehension during live foreign-language interaction.
- Developed a multimodal pipeline that extracts conversational keywords and generates contextual images to reinforce word–image associations.

Homelessness Discourse Retrieval-Augmented Generation System - *AI & Social Good*   **Jan 2025 – May 2025**
- Built an end-to-end conversational RAG pipeline using LangChain and Chainlit to answer user queries about homelessness, maintaining persistent memory, generating fact-grounded responses, and citing document sources in real time
- Indexed PDF documents (policy briefs, research papers, news reports) into a Milvus vector store by extracting text, splitting into semantically coherent chunks, enriching with structured metadata, and embedding via OpenAI's text-embedding-3-large service
- Tuned retrieval performance by configuring Milvus with L2 similarity search parameter optimization, and ensured robust citation handling by surfacing filenames and content previews of retrieved documents

Fine-tuning LLMs For Text To Emoji Translation   **Aug 2024 – Oct 2024**
- Fine-tuned a 7B-parameter LLaMA 2 model using QLoRA with 4-bit quantization (nf4) and LoRA adapters, enabling efficient low-resource adaptation for converting natural language into emoji sequences
- Evaluated performance through zero-shot and few-shot testing on both known and novel prompts, analyzing the model's ability to capture sentiment, tone, and figurative meaning in ambiguous or contradictory inputs
- Analyzed the effects of overfitting by retraining the model across extended epochs, observing performance degradation on unseen prompts and reduced semantic flexibility

WorNDle — Multilingual Wordle-Style Web Application   **Feb 2024 – May 2024**
- Developed a full-stack, multilingual Wordle-style web application supporting five languages, daily play limits, and persistent user history.
- Implemented core gameplay logic in Python and JavaScript, and built personalized user dashboards for tracking game history.
- Integrated RESTful APIs to enable secure purchase of additional plays from a remote server with real-time access updates.

ADDITIONAL INFORMATION

Programming Languages: Python, SQL, MATLAB, Typescript, JavaScript, C, Unix Shell Scripting
Data & AI/ML Libraries: PyTorch, Transformers (Hugging Face), Scikit-learn, LangChain, Optuna, Pandas, NumPy, Matplotlib
Databases: PostgreSQL, Supabase, Milvus
Software and Libraries: Linux, Git, Docker, Node.js, Django
Skills: Market Research, LLM Prompt Engineering, Excel, PowerPoint
Conferences: Columbia AI in Real Estate Student Seminar, CREtech New York 2025
Interests: Volleyball, Pokémon, Basketball, No-Limit Texas Hold'em, Game Theory, Travel