

TERRY LI

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EDUCATION

University of Michigan at Ann Arbor

B.S. in Electrical Engineering, minor in CS & MATH

- Transfer Student from the University of Illinois at Urbana-Champaign

Ann Arbor, MI

Expected May 2029

University of Illinois at Urbana-Champaign,

First-Year Studies B.S. in Electrical Engineering, minor in CSE & CS, GPA: 4.00/4.00

- James Scholar | Dean's List (Fall 2025, Spring 2026) | Grainger Engineering Scholarship (2026) / GRE 336

Champaign, IL

Aug 2025 - Aug 2026

TECHNICAL SKILLS

- Programming:** C++, Java, Python, SQL, JavaScript
- Machine Learning & AI:** TensorFlow, Keras, OpenAI API, RAG Architecture, Pinecone, Elasticsearch
- Backend & Systems:** FPGA: SystemVerilog, Spring Boot, Microservices, Redis, REST APIs, JWT
- Cloud & Infrastructure:** AWS (ECS, Lambda, SQS, S3), Kubernetes (EKS), Docker, Google Cloud Run
- Computer Science Foundations:** Data Structures & Algorithms (USACO Platinum), Operating Systems

PUBLICATIONS

Accepted Papers

Peilin Li. *Edge-Intelligence-Enhanced Proximal Policy Optimization (EIF-PPO) for Real-Time Power Balancing in Distributed Energy Microgrids*. *Informatica*, accepted for publication.

Manuscripts in Preparation

Peilin Li. *SPEM: A Split-Timescale Coupled Error Model for Stochastic-Photonic GEMM*.

Peilin Li. *Application of Deep Reinforcement Learning in Optimizing Virtualized GPU Resource Scheduling for Real-time Rendering*

RESEARCH EXPERIENCE

Universal Operations for Compositional Design

Aug 2026 – Expected May 2027

Researcher | *PURE-ECE Undergraduate Research Program, University of Michigan* | Supervisor: Prof. Inigo Incer

- Developing an automated framework for studying universal assume-guarantee contract operators, replacing error-prone manual evaluation of three-valued logic across nested compositions.
- Implementing a recursive abstract-syntax-tree evaluator that enumerates ternary inputs, generates truth tables, and analyzes operator properties and behavioral equivalence across configurable expression depths.
- Building diagrams and animations to trace composition structures and logical transitions, using weekly research reviews to diagnose anomalous cases, validate computational results, and refine evaluation methods.

Reinforcement Learning-Based Adaptive Scheduling for Virtualized GPU Systems

July 2025 – Expected Jan 2027

Researcher | *Undergraduate Research Program, Tsinghua University* | Supervisor: Prof. Yiyang

- Investigating deep reinforcement learning for virtualized GPU scheduling, addressing resource underutilization and latency instability caused by time-varying real-time rendering workloads; formulating adaptive resource allocation as a sequential decision-making problem.
- Developing a closed-loop scheduler that converts VM/GPU telemetry into workload states and dynamically selects GPU partitioning, preemption, and priority actions, with a reward function balancing utilization, task latency, service quality, and reconfiguration overhead.
- Evaluating the learned policy against static partitioning and fixed-priority baselines under changing execution conditions using GPU utilization, tail latency, SLA violations, and scheduling overhead; preparing an EI-indexed journal manuscript on the resulting framework and experimental findings.

A sphere by any other name

Aug 2026 – Expected Dec 2026

Researcher | *Lab of Geometry at Michigan LoG(M), University of Michigan* | Supervisor: Dr. Neza Zager Korenjak

- Investigating how alternative bilinear forms change the geometry of generalized spheres, with emphasis on symmetries, embedded circles, positivity, and cyclic order.
- Constructing and comparing low-dimensional examples using matrix representations and linear-algebraic analysis to identify invariant and form-dependent geometric properties.
- Developing computational visualizations and geometric diagrams that make abstract boundary-order structures interpretable and support further theoretical analysis.

SPEM: A Split-Timescale Coupled Error Model for Stochastic-Photonic GEMM

Feb 2026 - Expected Dec 2026

Researcher | *Undergraduate Research Program, Tsinghua University* | Supervisor: Prof. Yiyang

- Developed SPEM, a split-timescale model coupling stochastic-sampling variance with microring drift, shot noise, and WDM crosstalk to predict irreducible noise floors and bitstream saturation in stochastic-photonic GEMM.
- Derived $\text{Var}[S] = (A + C(N))/N + B$ and $N^* = O(\sigma\lambda^{-2})$, and built a disjoint calibration and Monte Carlo validation pipeline mapping measurable hardware parameters to GEMM-level NFMSE.
- Achieved 1.96% median prediction error over 200 held-out configurations and exact optima on a 234-point design grid; reduced sampling energy by up to 97.8% under matched error budgets and derived thermal-drift guard bands for a first-author journal manuscript.

Power Balancing Control Method for Distributed Energy Microgrids Based on Edge Computing

July 2025 – June 2026

Sole Author | *Informatica (forthcoming 2026), University of Illinois at Urbana-Champaign*

- Formulated real-time microgrid power balancing as a sequential decision problem and developed EIF-PPO to address power mismatch, frequency deviation, and battery instability under renewable intermittency and cloud-communication delays.
- Deployed a PPO actor – critic controller within a hierarchical edge architecture, transforming asynchronous PV, BESS, and load-bus telemetry into decentralized dispatch actions; constructed LMOD-based stochastic environments to emulate generation, demand, and communication uncertainty.
- Achieved a 62.5% reduction in inference latency and a 41% improvement in battery SoC stability relative to cloud-based control, independently completing framework design, simulation, benchmarking, analysis, and manuscript development.

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AI-Driven Lung Cancer Screening: A Comparative Analysis of Machine Learning Models

July 2024 - Sept 2024

Researcher | Summer Research Program, Carnegie Mellon University

- Conducted a comparative study of machine-learning methods for lung cancer screening using Kaggle datasets, examining differences in predictive performance and high-risk-case detection across classification approaches.
- Implemented a reproducible Python and TensorFlow/Keras workflow for data preprocessing, model training, and held-out testing, evaluating classifiers using accuracy, precision, recall, F1-score, ROC-AUC, and confusion-matrix analysis.
- Synthesized model comparisons and error-analysis findings into a co-authored research paper accepted at the 2024 International Conference on Modern Logistics and Supply Chain Management.

PROFESSIONAL EXPERIENCE

Artisk INC

San Francisco, CA

Engineer Intern

May 2026 - Aug 2026

- Developed and maintained backend services and APIs to support core product workflows.
- Designed data models, performed database operations, and integrated cloud services including authentication and file storage.
- Troubleshooted system issues, authored automated tests, and optimized the reliability and performance of existing systems.

SELECTED PROJECTS

Short-Term Rental Booking Platform

Aug 2025 - Feb 2026

- Refactored a tightly coupled Spring Boot monolith into modular services with separated search and booking workflows, supporting a React frontend and 50,000+ property listings.
- Reduced property-search latency from 800 ms to 50 ms (93.8%) by migrating fuzzy SQL queries to Elasticsearch and implementing geo-indexing and composite database indexes; maintained 99% availability on Google Cloud Run.
- Prevented double bookings by combining Redis distributed locks with PostgreSQL optimistic concurrency control, reducing transaction conflicts to 0.05% under high-concurrency testing.

Android Music Player | Kotlin, Jetpack Components, MVVM

Aug 2025 - Jan 2026

- Built a lifecycle-aware Android music player with Kotlin, Jetpack, and MVVM, addressing playback interruptions and inconsistent UI state during background execution and lifecycle transitions.
- Integrated ExoPlayer with MediaSession using coroutines, lifecycle-aware scopes, and synchronized callbacks to maintain reliable background playback across Android versions.
- Refactored asynchronous callbacks into a unidirectional StateFlow architecture, eliminating callback contention and redundant recompositions while reducing UI latency by 30%.

AI-Powered Document Analysis System

Aug 2025 - Dec 2025

- Architected an end-to-end RAG system with React, Node.js, and GPT-4 to transform PDFs into grounded answers, achieving 85% accuracy across 5,000+ evaluated queries.
- Built a semantic retrieval pipeline that segmented PDFs into 512-token chunks and indexed OpenAI embeddings in Pinecone, supporting 1,000+ daily queries.
- Reduced document-processing time from 45 seconds to 8 seconds (82%) by decoupling ingestion with SQS and Lambda and parallelizing chunking and embedding generation.

Twitch-Style Live Streaming Platform | React, Spring Boot, AWS

Aug 2025 - Dec 2025

- Developed a hybrid recommendation engine combining collaborative filtering and content-based ranking over 500,000+ user-item interactions, increasing average watch time by 25% in a two-week A/B test against a popularity-based baseline.
- Deployed Spring Boot microservices on AWS EKS with Redis caching for high-traffic content; sustained approximately 1,500 RPS across 10,000 simulated users with P95 latency below 250 ms in JMeter load tests.
- Reduced search latency from 800 ms to 200 ms (75%) by optimizing Elasticsearch inverted indexes, query caching, and shard allocation for concurrent, large-scale retrieval.

VEX Robotics V5 Project

July 2024 - Aug 2024

- Applied computational thinking and the engineering design process to develop control logic for VEX V5 robotics tasks.
- Wrote, tested, and debugged VEX C++ programs, translating task requirements into structured and executable robot behaviors.
- Completed the VEX V5 robotics curriculum and earned the VEX V5 Student Certification.

2023 World Robot Contest - BoxBot Ground Combat (BoxBot Robot Design & Combat)

Nov 2023 - Apr 2024

- Engineered embedded motor-control, power-management, and navigation algorithms for a BoxBot robot operating in real-time ground-combat scenarios.
- Integrated and debugged mechanical, electrical, and software subsystems, coordinating actuator control and power delivery to improve system reliability and responsiveness.
- Achieved 3rd place in the 2023 World Robot Contest Finals through iterative system integration and competition testing.

Simulated Traffic Lights

Apr 2023 - July 2023

- Developed an STM32-based traffic-light prototype to address inefficient fixed-cycle signaling under changing traffic conditions.
- Integrated infrared sensors for real-time vehicle detection and implemented adaptive signal-timing logic in C to adjust light cycles based on observed traffic.
- Delivered a functional embedded prototype integrating sensing, control, and signal actuation; received the Youth Creativity Invention Award.

AWARDS & HONORS

- Platinum Division, 2024 USA Computing Olympiad (USACO)
- Silver Medal (Top 4%), Kaggle HMS, Harmful Brain Activity Classification
- National Gold, 2024 Mathematics Competition
- National Gold, 2024 PHYSICS BOWL
- 3rd Place, 2023 World Robot Contest Finals
- VEX V5 Student Certification