Justin Dachille

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Education

King's College London — London, UK
PhD, Computer Science; Specialization in Artificial Intelligence — *October 2025 - June 2029*

Designed and benchmarked novel PyTorch optimizers with heavy-tailed Lévy noise to enhance exploration in complex optimization landscapes like MAX-SAT and the Ising Model.

Engineered a complete, reproducible research pipeline with Hydra and MLflow for automated experiment execution, tracking, and analysis across hundreds of runs.

University of California, Davis — Davis, CA
MS, Computer Science; Specialization in Machine Learning*; GPA: 3.9* — *September 2022 - June 2024*

Machine Learning, Artificial Intelligence, Computer Security, Visual Analytics, Computer Architecture, Operating Systems.

Led and arranged three small ensemble performances in the Video Game Orchestra @ UCD

Collaborated as an instrumentalist on one track for Music Production Club @ UCD's debut album.

University of California, Irvine — Irvine, CA
BS, Computer Science; Specialization in Intelligent Systems*; GPA: 3.73* — *September 2019 - June 2022*

Machine Learning, Deep Learning, Computer Vision, Optimization, Embedded Software.

Active member of Artificial Intelligence @ UCI and ACM @ UCI, participated in AI-related projects and coding challenges.

Publications

The Impact of Cut Layer Selection in Split Federated Learning
Justin Dachille*, Chao Huang, Xin Liu — AAAI Workshop DOI* — *November 2024*

Coopetition in Heterogeneous Cross-Silo Federated Learning
Chao Huang, ***Justin Dachille****, Xin Liu — European Conference on Artificial Intelligence DOI* — *October 2024*

An Accuracy-Shaping Mechanism for Competitive Distributed Learning
Chao Huang, ***Justin Dachille****, Xin Liu — International Conference on Artificial Neural Networks, DOI* — *September 2024*

When Federated Learning Meets Oligopoly Competition: Stability and Model Differentiation
Chao Huang, ***Justin Dachille****, Xin Liu — IEEE Internet of Things Journal, DOI* — *May 2024*

Experience

Stay Liquid — London, UK
Backend Software Engineer — *Skills: TypeScript, NestJS, Viem, Jest, DeFi* — *July 2024 - Present*

Architected and developed the primary DeFi transaction payload API using NestJS, replacing an unreliable legacy service and improving transaction generation speed by over 10x for complex multi-protocol swaps.

Designed a modular system for interactions with diverse protocols such as Curve and Pendle; validated its robustness by building a resilient E2E test suite to stabilize the CI/CD pipeline.

University of California, Davis — Davis, CA
Graduate Student Researcher — *Skills: PyTorch, Python, CUDA, C++, Apollo, LGSVL* — *September 2022 - June 2024*

Led development and implementation of state-of-the-art federated learning algorithms across GPU clusters, resulting in 4 publications in AAAI, IEEE, ICANN, and ECAI, with demonstrated improvements in model performance and system efficiency through comprehensive experiments across multiple datasets.

Architected and implemented a distributed training system leveraging GPU clusters to facilitate large-scale federated learning experiments, optimizing resource utilization and reducing training time by 8x.

Enhanced autonomous vehicle security testing by developing a sensor desynchronization framework in Apollo, implementing targeted C++ methods to inject configurable delays into sensor data streams, revealing critical vulnerabilities in the sensor fusion pipeline and enabling systematic evaluation of system resilience.

Percipient.ai — Santa Clara, CA
Full Stack Software Engineer Intern — *Skills: Python, Django, TypeScript, React* — *June 2022 - September 2022*

Architected and delivered mission-critical features for an AI intelligence analysis platform, improving data processing efficiency through optimized Django API endpoints and streamlined React components.

Collaborated closely with a cross-functional team to develop new features within a high-performance Django API server and a responsive React-Redux frontend.

Enara Health — San Mateo, CA
Frontend Software Engineer Intern — *Skills: React Native, TypeScript, Node, REST APIs* — *June 2021 - September 2021*

Led comprehensive modernization of healthcare mobile application, architecting a new React Native & TypeScript codebase that reduced maintenance overhead and improved app performance by 35%.

Engineered integration between REST API services and frontend components, implementing robust error handling and state management.

Personal Projects

D'Analysis - Stablecoin Volatility Module — London, UK

Open Source Project *Skills: Python, PostgreSQL, GraphQL, API Integration, Data Analytics* *October 2024*

Developed a critical volatility tracking module for D'Analysis platform (**finalist** at Encode London Hackathon), enabling real-time risk assessment of DeFi stablecoin pools by implementing Rogers & Satchell volatility calculations and MSE deviation analysis.

Engineered an automated data pipeline integrating CoinGecko and CoinMarketCap APIs with PostgreSQL database and GraphQL endpoints, featuring continuous updates, comprehensive error handling, and rate limiting, supporting analysis of major stablecoins.

Fit Finder — Davis, CA

Web Application *Skills: Python, Flask, SQLite, LLM, Web Scraping* *July 2024*

Developed an AI-powered web application to streamline candidate-job matching using Indeed data and Meta's Llama 3 LLM.

Engineered a Flask-based system that autonomously scrapes job listings, applies LLM-driven analysis for custom criteria (e.g., visa sponsorship, skill fit), and presents results via an intuitive web interface, reducing manual filtering time by an estimated 70%.

LoRA Time Series Transformer — Davis, CA

Academic Project *Skills: PyTorch, Python* *March 2023 - June 2023*

Pioneered the implementation of Low-Rank Adaptation (LoRA) in Multivariate Time Series Transformers, reducing trainable parameters by up to 94% (from 404,865 to 22,056) while maintaining comparable performance to full parameter fine-tuning.

TRACC — Davis, CA

Web Application *Skills: Vue.js, REST APIs, Data Visualization* *January 2023 - March 2023*

Developed TRACC, a web application utilizing the GitHub API to visualize code authorship and changes over time.

Implemented data visualization libraries to present insights into code contributions within a GitHub repository.

TLS Classification — Davis, CA

Academic Project *Skills: PyTorch, Python* *September 2022 - December 2022*

Developed a lightweight neural network to classify TLS traffic into seven categories using packet timing metadata, achieving high precision and recall, and uncovered insights into defending against information leakage.

Binary Integer Optimization Solver for Trip Placement — Stanford, CA

Github *Skills: Python, Optimization, NumPy* *March 2022- June 2022*

Developed a tool using optimization techniques to allocate Stanford University students to limited learning opportunities, reducing the manual process time by up to 90%.

Implemented a custom Genetic Algorithm to explore high-dimensional data spaces and find the global optimum among multiple constraints; the program has been in use since Spring 2022.

3D Object Scanning using Structured Illumination — Irvine, CA

Report *Skills: Python, NumPy, OpenCV* *March 2022*

Implemented a 3D object scanning system using structured illumination and stereo image pairs. Developed custom mesh smoothing and geometry repair algorithms, along with Delaunay triangulation.

IPFSp.in - Persistent File Storage Service — Mountain View, CA

IPFSp.in *Skills: Python, CherryPy, HTML, Javascript, CSS* *June - August 2020*

Developed end-to-end service to pin files using the InterPlanetary File System protocol. Allows users to share and retrieve any file using a unique and permanent identifier at a competitive price.

Tweet Chooser — Los Altos, CA

Tweet Guessr *Skills: Python, TensorFlow, NLP, Colaboratory, Javascript* *March 2019*

Leveraged TensorFlow to synthesize new tweets using a deep neural network trained on over 33,000 celebrity tweets. Created a fast-paced trivia game challenging the user to identify AI-generated tweets.

Skills Summary

Languages & Frameworks: Python, TypeScript, React, Django, Node.js, PyTorch, C++, SQL, GraphQL, Angular, Vue.js

Tools: Docker, AWS, GCP, Git, REST APIs, PostgreSQL, Redis, CI/CD, Kubernetes, Jira, TensorFlow

ML/AI: PyTorch, CUDA, TensorFlow, NLP, NumPy, OpenCV, Tensorboard

Objective: Skilled Software Engineer with expertise in AI, machine learning, and full-stack development. Adept at problem solving and research. Eager to contribute to team-oriented projects and innovative solutions.

Interests

Music: Avid piano player versed in classical and jazz genres, with a passion for hobbyist music production.

Digital Content Creation: Manage multiple YouTube channels (5M+ total views); proficient in Adobe Creative Suite & Final Cut for video production and effects.

Cooking: Home chef focused on improvisational cooking and ingredient-driven recipe development, specializing in transforming farmers market finds into creative dishes.

Favorite Book: *Deep Work* by Cal Newport