James Han

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA — May 2024
Bachelor of Science in Computational and Applied Mathematics

WORK EXPERIENCES

AI Research Engineer, Shanghai Research Institute of Chemical Industry Co., Ltd. Sep 2025-Present

- Coordinated with 9 internal departments to identify AI opportunities and translate needs into executable AI tasks, data requirements, and deliverables.
- Built and curated a structured dataset for POE catalyst systems by collecting experimental results and standardizing 12 fields for modeling.
- Developed ML workflows to predict polymer performance targets from catalyst and reaction features, achieving up to $R^2 = 0.97$ on held-out validation.

Software Development Intern, Bio-Techne May 2024-Sep 2024

- Developed a web application LukaLEO to streamline and centralize access to calibration data, improving efficiency and accuracy in managing instrument information.
- Engineered a PostgreSQL database with Flask and SQLAlchemy to make calibration and instrument data maintainable and quick to query.
- Delivered an admin platform via Flask-Admin, allowing users to upload instrument data, view calibration details, and export data in CSV format.

Data Analyst Intern, Zero-One Fission Digital Technology Co., Ltd Jun 2023-Aug 2023

- Applied SQL to retrieve and calculate the data of 1000+ kinds of product and user features
- Collaboratively implemented a LightGBM-based decision tree algorithm to filter out the top 10 features useful in boosting the GMV of the Watsons online market

RESEARCH EXPERIENCES

Researcher, Lambda Calculus and Proof Theory Sep 2024-Jul 2025

- Created proof-driven research notes on normalization and reduction strategies to strengthen rigor for subsequent work in proof theory.
- Investigated the connections between typed and untyped lambda calculus, with an emphasis on the implications for computational logic and formal verification.
- Engaged with foundational results such as the Church-Rosser theorem and exploring extensions to classical lambda calculus.

Researcher, Fairness in Multimodal and Multilingual NLP Systems Sep 2023-Jan 2024

- Motivated by the need to rectify biases on the interplay between text and image data across different languages and cultural contexts in NLP systems
- Framed a fairness evaluation plan for multimodal, multilingual settings to measure bias across 9 languages, translating qualitative concerns into testable metrics.
- Implemented data augmentation and ran controlled experiments to quantify bias patterns under different training and evaluation conditions.

Researcher, Companion Personality Development for AI Systems Apr 2023-May 2024

- Motivated by the challenge of creating AI companions that truly resonate with human behaviors
- Collaborated on dataset preprocessing and augmentation using TensorFlow, and optimized model training configurations for improved interaction
- Improved response quality through iterative evaluation, increasing persona-consistency pass rate from 72% to 86% and reducing repetitive responses by around 30%.

TECHNICAL SKILLS

Software: Proficient in Matlab, LaTeX, Visual Studio Code, R Studio, Excel, PowerPoint, Word
Computer Languages: Proficient in Python, C, SQL, SML
Languages: Native proficiency in English and Mandarin; Intermediate proficiency in Japanese