

Ming Leong (Lucas) Tsui

Software Engineer | Backend & Full-Stack Development | Research Engineer

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PROFESSIONAL SUMMARY

Software engineer and technical lead experienced in building scalable backend systems, RESTful APIs, full-stack applications, and automated data pipelines across research and industry. Take end-to-end ownership of the software development lifecycle (SDLC), translating ambiguous requirements into system architecture, tested software, deployment, and ongoing maintenance. Combine hands-on engineering with a Master of Science in Computer Science in progress at Boston University; bring adaptability across scientific computing, financial systems, and business automation.

PROFESSIONAL EXPERIENCE

Boston University / NASA - Research Engineer

Boston, MA | September 2025-Present

- Develop scientific software and data infrastructure for NASA's Carruthers Geocorona Observatory, enabling researchers to explore satellite imagery and investigate atmospheric phenomena.
- Owned system design and deployment of server, cloud-storage, and image-caching infrastructure, supporting approximately 10 TB of new satellite data annually while balancing scalability, compute, memory, and storage requirements.
- Applied data structures, algorithms, and caching strategies to optimize image retrieval, reducing latency and supporting real-time exploration of terabytes of satellite imagery.
- Led scalable backend and API development, designing REST endpoints alongside a React/JavaScript frontend, enabling researchers at Boston University, the University of Illinois, and UC Berkeley to query and explore satellite imagery.
- Migrated and refactored 40-year-old legacy IDL code into Python, applying object-oriented design and software design patterns to create modular, maintainable components and reduce technical debt.
- Wrote unit and integration tests to validate numerical parity with legacy outputs; applied debugging and problem-solving to identify floating-point inconsistencies between IDL and Python implementations.
- Built GitHub Actions CI/CD pipelines for automated testing and deployment, using pipeline orchestration and Docker containerization for consistent delivery across research environments.
- Drove cross-functional collaboration and stakeholder communication across three universities, translating evolving research requirements into engineering tasks through Agile sprint planning and backlog prioritization.
- Implemented a complex quaternion model of the satellite and achieved its first successful visualization.

AYQ Limited - Founder, Director & Technical Lead

Glasgow | April 2020-Present

- Owned the software development lifecycle from requirements gathering and system architecture through deployment, building information systems for property research, document processing, and remote portfolio management.
- Led and mentored a small technical team, providing technical leadership through code reviews and software architecture guidance and establishing coding standards for AI-assisted document automation.
- Designed and integrated REST APIs connecting in-house AI tooling with an existing SQL database, automating daily processing of property purchase and sale documents.
- Developed web-scraping and data-processing pipelines, applying data modeling and relational and NoSQL storage to organize property research data.
- Defined property-domain concepts to guide AI interpretation of documents and developed Bayesian forecasting models to evaluate property performance.
- Reduced annual tax-report preparation time by **90%** compared with the previous manual spreadsheet process.
- Drove cross-functional collaboration with letting agents and property stakeholders, combining stakeholder management, requirements gathering, and clear communication with non-technical stakeholders to automate operational workflows.

Hoi Yin Property Management - Tech Lead, Data Systems & Operations

Hong Kong | September 2014-April 2020

- Owned the maintenance and modernization of information systems covering rent calculations, tax estimates, invoicing, and customer service.
- Developed automation scripts in Microsoft Excel and Access, replacing manual calculation and reporting processes.
- Reduced monthly rent-calculation and invoice-delivery time by **99%**, from **days to seconds**, through calculation automation and digital invoice delivery via WeChat.
- Automated processing of tenant inquiries and communicated with business stakeholders to align system improvements with operational needs.
- Expanded the tenant pool into mainland China through social media marketing.

PROFESSIONAL EXPERIENCE - CONTINUED

UnixSolve - Programming Assistant

Singapore | August 2013-February 2014

- Designed object-oriented Java components and interfaces connecting MUREX, Front Arena, and banks' internal systems, enabling modular integration between financial platforms.
- Developed bond-portfolio analysis tools for institutional investors and implemented Monte Carlo simulations for portfolio risk analysis.

SELECTED SOFTWARE PROJECTS

Self-Improving Factory - Agent Planning & Simulation

<https://github.com/lucastsui/RINA-Recursive-Factory> | In development

- Developing a factory simulation with approximately **one million** moving product units and production chains that transform raw materials into finished products.
- Building agents that locate resources, plan mines and logistics, identify bottlenecks, and recursively plan additional production capacity.
- Applying concepts from Recursive InterNetwork Architecture (RINA) to factory design. Source code publicly available on GitHub.

Model Soup - AI-Assisted Research System

<https://github.com/lucastsui/ModelSoup> | In development

- Developing a research system that combines quantitative data and news to propose explanatory models using statistical methods and neural networks.
- Applying the system initially to Scotland's housing market to investigate potential explanations for market behavior. Source code publicly available on GitHub.

TECHNICAL SKILLS

Core Competencies: API design, REST API development, object-oriented programming (OOP), software design patterns, data structures and algorithms, system design and architecture, scalability, distributed systems, microservices, concurrency, caching strategies, data modeling, performance and code optimization, code refactoring, debugging, problem-solving, systems integration.

Languages: Python, Java, SQL, JavaScript, TypeScript.

Frontend & APIs: React, interactive user interfaces, data visualization, REST, GraphQL.

Databases: MySQL.

Cloud & Infrastructure: Microsoft Azure, Docker, Heroku, infrastructure as code (IaC), Linux/Unix command line, Bash scripting, NVIDIA DGX.

Development & Quality: Version control with Git, GitHub Actions, continuous integration and continuous deployment (CI/CD), pipeline orchestration, automated deployment, code review, technical documentation, unit testing, integration testing, software quality assurance, Agile/Scrum.

AI & Scientific Computing: PyTorch, TensorFlow/Keras, scikit-learn, NumPy, SciPy, pandas, Matplotlib, Seaborn, Mathematica/Wolfram, language-model deployment, LLMOps, model interpretability.

Quantitative Methods: Bayesian modeling, Monte Carlo simulation, numerical methods.

EDUCATION

Boston University - Master of Science in Computer Science

Concentration: AI & Machine Learning

September 2025-May 2027, expected | GPA: 3.71/4.00

Relevant coursework: Software Engineering, Operating Systems, Analysis of Algorithms, Computer Networks, Artificial Intelligence, Machine Learning, Deep Reinforcement Learning, Computer Vision.

University of London - Bachelor of Laws (LL.B.)

September 2019-May 2021 | GPA: 3.70/4.00

City University of Hong Kong - Bachelor of Science in Applied Physics

September 2011-May 2013

Leadership: Led the local chapter of AIESEC, an international student organization.

CERTIFICATIONS

NVIDIA Certified Professional: Gen AI LLMs - 2026

MuleSoft Certified Developer Level 1 - 2023

LANGUAGES

English - IELTS 8.5 | Cantonese - Native | Mandarin - Native