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Houfu Chen

Summary

– Aspiring PhD student aiming to bridge undergraduate knowledge in nanotechnology engineering with graduate expertise in machine learning.
– Research interests include ML-driven projects, simulations, and nanostructured material and devices.

Education

University of Waterloo **GPA: 81.31%**
B.A.Sc. in Nanotechnology Engineering (With Honor)
Graduated 06/2023

Relevant Coursework:

Structure & Properties of Nanomaterials	(81)
Macromolecular Science	(90)
Microfabrication and Thin-film Technology	(86)
Surfaces and Interfaces	(89)
Biochemistry	(92)
Semiconductor Physics	(87)
Simulation Methods	(85)
Nano-electronics	(93)
Biosensors	(96)

***Labs**: Laboratory Characterization Methods (82), Characterization of Materials Laboratory (78), Microfabrication & Thin-film Technology Laboratory (93), Macromolecular Science Laboratory (87)*

University of Toronto **GPA: 3.84 / 4.0**
M.Eng. in Electrical & Computer Engineering (Featured Alumni in ML & Analytics Emphasis)
Graduated 03/2025

Relevant Coursework:

Foundations of Data Analytics and ML	(A+)
Introduction to Machine Learning	(A+)
Wearable AI	(A+)
Cloud Computing	(A+)
Cloud-Based Data Analytics	(A+)
AI Applications in Robotics	(A)
Bio-inspired Algorithms for Smart Mobility	(A)

Research Experience

Phosphate Management and Humic Acid Evolution in Maize Systems May 2025 – Present
College of Agriculture, Jilin Agricultural Science and Technology University *Jilin, China*

– Co-authored a research article (target publication Dec 2025) on molecular evolution of humic acid and carbon-sequestration dynamics under variable phosphorus fertilization in albic soils.
– Led Python- and ML-based analysis of multi-year field trial datasets (fluorescence spectroscopy, FTIR, thermogravimetric, soil chemistry) to uncover additional mechanistic insights.
– Applied principal component analysis (PCA) to integrate multi-dimensional soil chemistry, spectroscopy, and yield metrics, producing composite scores that ranked fertilization treatments and supported identification of the optimal application rate.
– Edited and structured the manuscript for clarity, logical flow, and journal compliance, ensuring accurate interpretation of statistical and spectroscopic findings.

ML-Based Emotion Analysis in Video [Demo] 03/2025
Independent Research Project *Toronto, ON*

– Developed and evaluated a facial emotion recognition pipeline using DeepFace and MediaPipe, targeting robust performance across varied video conditions.
– Explored emotion clustering patterns from facial landmarks and video context frames to correlate mood shifts.
– Analyzed model performance across emotion types and edge conditions to inform model improvements.

Emergency Route Planner Framework [Demo] 09/2024 – 12/2024
University of Toronto; Group Research Project; Bio Inspired Algorithms and LLM *Toronto, ON*

– Designed a multi-agent simulation platform for emergency evacuation planning, integrating optimization algorithms and ML-assisted decision-making.
– Used LLMs to evaluate model performance across diverse environmental and infrastructure scenarios, enabling adaptive decision-making for each evacuee.

Research Assistant – Polymer and Organic Electronics Lab 05/2019 – 08/2019
University of Waterloo; Yuning Li's Group *Waterloo, ON*

– Awarded the **President's Research Award**.
– Performed UV-vis spectroscopy, liquid-liquid extraction, and chromatography for polymer material characterization.
– Supported research in polymer semiconductors and organic thin-film materials for flexible electronics.
– Documented experimental procedures and maintained detailed lab records for reproducibility and reporting.

Teaching Experience

Teaching Assistant – APS1070: Foundations of Data Analytics and Machine Learning Winter 2024, Summer 2024, Fall 2024, Winter 2025
University of Toronto *Toronto, ON*

– Conducted Q&A in 10+ tutorials, covering topics in Python, data preprocessing, Neural Networks, and regression/classification methods.
– Graded 100+ projects and exams per term with consistent rubrics and supported students via Piazza Q&A and one-on-one help.
– Helped maintain a responsive and inclusive online discussion board presence (Piazza).

Teaching Assistant – CSC108: Introduction to Computer Programming Summer 2024, Fall 2024, Winter 2025
University of Toronto *Toronto, ON*

– Assisted beginner programmers in Python fundamentals, algorithmic thinking, and debugging strategies.
– Supported students with Python programming and conceptual understanding during office hours and in-class exercises
– Encouraged and led students to do their own coding experiments to get familiar with programming.
– Marked assignments/projects for a class of 500+ students per term.

Teaching Assistant – MIE370: Introduction to Machine Learning Summer 2024, Fall 2024
University of Toronto *Toronto, ON*

– Contributed to exam and project question design and participated in proctoring and academic support.
– Supported students in supervised learning, model evaluation, and practical ML applications.
– Conducted Q&A in 10+ tutorials, covering topics in Python, data preprocessing, Neural Networks, and regression/classification methods.

– Reviewed student submissions and provided constructive feedback on code and methodology.
– Helped maintain a responsive and inclusive online discussion board presence (Piazza).

Work Experience

Complaints Management & Internal Consulting (Intern) 05/2025 – 07/2025
FAW-Volkswagen Automotive Co., Ltd. *Changchun, China*

– Led the escalation and resolution of high-risk customer complaints by coordinating with 4S dealerships and internal teams; ensured fairness in outcomes while mitigating legal and reputational risks.
– Analyzed complaint logic and supporting evidence to assess liability and construct reasoned responses aligned with legal and procedural guidelines.
– Built and maintained QBI Kanban dashboards to track complaint progress, identify systemic issues, and support data-driven process optimization.

WiFi Software Testing Engineer (Intern) 05/2022 - 08/2022
Ford Motor Company Of Canada Limited *Oakville, ON*

– Tested ECU components (SYNC and TCU) using iperf3 under various protocols (TCP/UDP/FTP/HTTP), scenarios (small files, large files, combined), frequencies (2.4GHz/5GHz), and security levels (Open/WPA2).
– Set up a client-server testing environment via Remote Desktop and Ubuntu to execute performance tests.
– Resolved 40+ SSH exceptions by upgrading Ubuntu and iperf3 and adjusting WLAN commands.
– Authored comprehensive documentation on Ubuntu usage, iperf3 procedures, and troubleshooting for SSH and Selenium.

QA Developer / Automation Specialist (Intern) Three Internships: 01/2020 – 04/2021
Manulife, Teranet Inc., and Imagine Communications *Waterloo & Mississauga, ON*

– Designed and implemented automated test cases using JavaScript, React, and C# within Selenium to ensure UI and system stability across web platforms.
– Improved test efficiency by adopting BDD/TDD, resolving over 40 SonarQube issues, raising test coverage by 20%.
– Built scripts to monitor server health and simulate user interactions; ensured UI accessibility by verifying visibility rules for disabled elements.
– Presented QA insights & defect analysis to 50+ stakeholders, contributing to cross-team coordination & issue resolution.

Projects

FoodRacoon – Public ML-Powered Restaurant Recommender [Live Deployment] 04/2025
LLM + MLOps Deployment; Machine Learning Engineer *GitHub*

– Developed & deployed a user-facing ML tool that interprets natural food cravings (in English/Chinese) into restaurant recommendations using GPT-4.
– Integrated Yelp and Google Maps APIs to generate and rank real-time location-based recommendations.
– Built a customizable scoring system enabling users to adjust weights (rating, price, review count) in advanced mode.
– Implemented a serverless backend with AWS Lambda, API Gateway, and OpenAI integration.
– *Note: Currently using Yelp/Google Maps APIs; Dianping API planned for Mainland China support.*

Other ML Personal Projects 2024 - 2025
MLOps and Model Deployment; Machine Learning Engineer *GitHub*

– Reinforcement Learning (2024): Designed and deployed RL agent with monitoring and performance metrics.
– Financial Tool (2024): Built and operationalized LLM-powered financial service analysis tool.

Skills

Programming Languages: Python, SQL, C/C++, C#, JavaScript

Testing & QA: Selenium, iperf3, Charles Proxy, BDD/TDD, Performance Testing, SonarQube, API Testing

ML/AI: TensorFlow, PyTorch, Scikit-learn, LLMs, DeepFace, Feature Engineering, Neural Networks

DevOps & Infrastructure: AWS Lambda, API Gateway, Git, Docker, Kubernetes, Linux/Ubuntu, Azure, TCP/IP Networking

Data Engineering: Pandas, NumPy, Model Monitoring, Data Visualization

Certifications

University of California, Davis - SQL for Data Science(03/2025)

Stanford & DeepLearning.AI - Machine Learning Specialization (03/2025)

Stanford Algorithm & Data Structures Certification (01/2025)

Euclid Mathematics Contest Top 25% in Canada, Top 1 in High School (04/2018)