Jethro Au

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Education

Msc. in Big Data Technology - Hong Kong University of Science and Technology **In Progress - June 2025 (Anticipated)**
GPA: 4.0/4.3 | HKUST School of Engineering (CS & Math)
Courses: Research in AlphaFold, LLMs, Data Mining, Big Data Computing, Mathematical Foundations, Image Processing, RL

B.S. Industrial Engineering - Northwestern University **2018**
McCormick School of Engineering (IE)
Courses: Stats & Machine Learning, Optimization Algorithms, Accelerated Physical Chemistry, Multivariate Calculus, Data Management

Certificate in Managerial Analytics - Northwestern University **2018**
Kellogg School of Management: Certificate Program for Undergraduates
Courses: Analytics for Strategy, Operations & Supply Chain Strategy, Competitive Strategy & Industrial Structure, Pricing

Professional Work

R&D / Head of Business Development **Jun 2023 – Present**
C-POLAR Asia, Hong Kong (Health Technology)

- Digital infectious disease prevention: Researching and prototyping use of IoT sensors for continuous infectious disease monitoring with digital twins at hospitals with Dr. Anthony Law (HK PolyU) and industry partners. Researched methods for spatial and temporal analysis, such as statistical and machine learning methods to calibrate low-cost multi-array indoor air quality & occupancy sensor data for real-time aerosolized microorganism risk-scoring.
- Initiated research projects with universities & hospital laboratories on non-drug based methods to combat antibiotic-resistant organisms w/ cationic polymers that selectively disrupt protein membranes and envelopes.
- Developed antimicrobial products and coordinated comparative studies at long-term care facilities that statistically validate effectiveness of polymer-embedded healthcare applications in reducing Hospital Acquired Infection (HAI) risk.
- Represented company in scientific conferences to build research partnerships: Asia Pacific Society of Infection Control 2024 (Jakarta), Institute of Healthcare Engineering and Estate Management 2023 (IHEEM)
- Formed strategic partnership with a Fortune-500 multinational and served as key technical manager in the R&D and launch of a data-visualization and data-processing platform for automated, continuous environmental safety governance (Python: sklearn, pd, np, sns, matplotlib & LLM prompt engineering).

Strategy & Operations Manager (Data & Special Projects) **Jun 2021 – May 2023**
Prenetics, Hong Kong (Biotech Unicorn - Listed on NASDAQ 2022)

- (COVID-19 2nd wave & onwards) Led RT-PCR diagnostic tests for all inbound travellers during COVID-19, a high-profile project implementing decentralized point-of-care screening as part of HK's COVID-19 health policy.
- Rapidly iterated, developed and implemented health data solutions to solve challenges during time of crisis:
  a. Digitally-augmented remote-testing practices with a telehealth mobile app and backend analytics for healthcare workers, such as automating data tasks via computer vision (OpenCV)
  b. Improved service delivery quality through a NLP-driven performance scoring algorithm, use of sentiment analysis with BERT (HuggingFace API) from personalized SMS satisfaction surveys (Twilio SMS API).
  c. Developed prediction models for 7-day caseloads to improve manpower rostering, combining data crawling, scheduling, and daily residual bias prediction with multivariate regressions, decisions trees, and statistics (Poisson/MA/EMA).
  d. Improved data quality of over +2M reported results and mitigated false-positive reporting risks due to noisy electronic health records through ETL & reporting infrastructure on dockerized Python scripts deployed on AWS server.
  e. Trained a mask-detection application (Flask) to augment PPE training by fine tuning YOLOv5 *(used for trial only)*
- Collaborated with the Department of Health to set the gold operational standard for RT-PCR testing and served as consultative expert on COVID-19 health policy changes.
- Implemented Large Scale Scrum (LeSS) with a team of 25 people that manage up to 100+ daily average fleets, 400+ healthcare workers, 70+ hotel network partners, and sub-contractors for RT-PCR testing.

Innovation Consultant
PwC **Sept 2018 – May 2021**

- (COVID-19 1st wave) Resolved bottlenecks in public health administration of the 1st tranche of a HKD$80B emergency relief scheme for all companies during COVID-19 lockdowns. Introduced a data-driven operations with data pipelines and dashboards to automate handling of voluminous applications (Python, PowerBI, UIPath)
- Rotated across various departments for consulting projects, including advising management board members on digital strategies and market research on trends on pharma, artificial intelligence, biotechnology

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Academic Work

Independent Research on AlphaFold for Cyclic Peptide Design **Jul 2024 – Now**
Hong Kong University of Science and Technology

- Under supervision of Prof. Nevin Zhang from the CSE department and Dr. Tao Wang (inventor of HIV antiretroviral drug Rukobia), researched use of AlphaFold for de-novo design of cyclic peptides for Hepatitis-C and HIV
- Conducted literature reviews on AlphaFold architecture, ColabFold implementation (on Google Colab), in-silico cyclic peptide designs methods, comparisons on AlphaFold accuracy, molecular simulations (Rosetta / Pymol / Gromacs)
- Conducted hyperparameter tuning of AlphaFold network such as : optimal sequence length, hotspot configurations, learning rates, inference time, random seeds, and optimizer methods (SGD / AdamW / Adagrad)
- Researching into physics-based calculations into loss function to generate binding-energy optimized peptides

Random Forest Parallelization with Spark **Mar 2024 – Jun 2024**
Hong Kong University of Science and Technology

- Explored optimization of the Random Forest algorithm using parallel computing in Spark on Microsoft Azure to measure how to improve training time of random forest through the divide and conquer approach.
- Developed three implementation strategies of distributed Random Forest - a top-down approach of parallelizing decision tree building and two bottom-up approaches that parallelize the node-splits algorithm (Depth-First and Breadth-First search)
- Analyzed training times and computational overhead, proposing enhancements for dynamic partitioning and resource allocation.

Stroke Prediction with Machine Learning **Oct 2023 – Dec 2023**
Hong Kong University of Science and Technology

- Conducted exploratory data analysis (EDA) for stroke risk prediction using machine learning techniques and compared methods to tackle imbalance datasets (from Kaggle) of only 5,000 patient records with data augmentation methods to generate synthetic data - SMOTE and conditional Generative Adversarial Networks (cGAN).
- Benchmarked performance with ML models by cross validating models on F1 score tuned w/ grid & bayesian search, comparing effect of synthetics data vs non-synthetic data on: Naive Bayes, Support Vector Machines and Deep Neural Networks (DNNs).

Cancer Research Intern **Aug 2012 – Sept 2012**
MD Anderson Cancer Research Center, Houston, US

- Summer intern for Dr. Samuel Mok who leads the laboratory in the Department of Gynecologic Oncology and Reproductive Medicine at the University of Texas MD Anderson Cancer Center.
- Conducted immunohistochemistry to localize APAF1 and COMP in primary and metastatic ovarian cancer cells and, in a short period of time, generated sufficient amount of data to be included in a manuscript submitted to a peer-reviewed journal.

Publications & Achievements

- Co-Author in “Financial Considerations in Primary Healthcare after COVID-19”, *Springer Nature* (pre-print)
- TPG Fellowship for MSc. Big Data Technology
- Co-Founder of Northwestern Blockchain Group
- Northwestern Dean’s List (2017)
- Certificate in Deep Learning Specialization - DeepLearning.AI
- Certificate in Professional Scrum Master 1 (PSM1)
- Certificate in UIPath Professional Developer

Community & Philanthropy

- Charity Photobook Exhibition (Project Director): Led the product development, planning, marketing, and publication of “FORCES AT WORK”, a charity photobook exhibition. Raised HKD $100K for Médecins Sans Frontières (Doctors Without Borders) in book sales.
- ACS Sprint Hackathon Pitch Winner (2018): Represented PwC in a non-profit hackathon event hosted by the Asian Charity Services (ACS). Pitched and won HKD $25,000 for non-profit organization AuDeAHK by pitching the use of haptic feedback gloves to enhance the sensory experience of visually impaired individuals.

Skills

- Programming: C++, Python | Packages: sklearn, tensorflow, pandas, numpy, JAX, matplotlib, sns, opencv
- Data Analytics: R, MATLAB, STATA, Alteryx, Power Query, PowerBI, Tableau, UIPath, AMPL
- Database: SQL, Spark, Hadoop
- Biomedical computation: AlphaFold, ColabFold, ColabDesign, PyMol, PyRosetta
- Languages: Native in English, Mandarin, Cantonese | Beginner in German
- Hobbies: Golf, Disc Jockey, Pleasure Vessel Operator Certificate Grade 2 (PVOC2)