HUANG Tin Yeh (Heaven)

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Education

The Hong Kong Polytechnic University, HKSAR, China *Sept. 2024 – Aug. 2028*
B.Eng. Scheme in Product and Industrial Engineering, Department of Industrial and System Engineering
Student Intern, PolySmart, Research Centre – Data Science and Artificial Intelligent

- Major Courses *(Current)*: Engineering Design, Programming, Engineering Economics, Advanced Mathematics, Fundamental of Physics
- Exchange: 2024 Teacher and Student Exchange Plan between Mainland Universities and Universities in Hong Kong and Macao, Northeastern University & The Hong Kong Polytechnic University Intelligent Car Human-machine Shared Control Exchange Project

Tsinghua Tsien Excellence in Engineering Program (TEEP) & X-institute, Shenzhen *Sept. 2024 – Aug. 2028*
Jointed Training Student (Social Innovation Track)

- Major Course: X-Idea *(Past)*, Enhanced Student Research Training (ESRT)*(Current)*

Hong Kong Community College, CPCE, PolyU, HKSAR, China *Sept. 2023 – Aug. 2024*
Associate in Statistics and Data Science

- Major Courses: Statistics, Calculus and Linear Algebra(A), Programming(A+), Data Science(A-), Applied Information Technology(A-), Economics

Pui Kiu College, HKSAR, China *Sept.2018 – Aug. 2023*

Research Experience

My Research Interest:

- Artificial Intelligence and Machine Learning
- Spatial and Ecological Data Science
- Multi-Agent Systems
- Digital Twin in Ecosystems and Urban Systems (Computational World)
- Operations Research and Optimization, Technology Ethics and Social Impact

Project:

Pre-print:

- Huang, T. -Y., Wang, X.*, Wang, Y. (2024). crypto-ncRNA: Encryption algorithm based on non-coding RNA (ncRNA) ***(JCR Q1; Ready to Submit)*** *Sept. 2024 – Now* [Github link]
  - Designed an encryption system leveraging non-coding RNA (ncRNA) characteristics for enhanced security
  - Demonstrated the theoretical advantages of RNA sequences, including physical unclonability, high randomness, adaptability, and intrinsic unpredictability, in cryptographic applications.
  - Integrated dynamic key generation, gene sequence transcription, and redundancy protection mechanisms
  - Achieved 100% pass rate in NIST SP 800-22 tests, ensuring randomness and robustness.
  - Optimized encryption speed, nearing AES algorithm performance.

  Keys: *Bio-inspired encryption, Non-coding RNA (ncRNA), Advanced cryptographic system*

Current:

- **Huang, T. Y.**, Wang, Y. *The Application of Multi-modal BERT Model in Extraction and Analysis of Global Heat Wave Disaster Adaptability Factors *Oct. 2024 – Now* [CAS Website (No. 2 in xlsx]
  (Project of Innovative Practice Training Program for College Students, Chinese Academic of Sciences, Advisor: Prof. Yong Ge)
  Keys: *Climate Change; Climate Risk Management; Multimodal Artificial Intelligence; Intelligent Decision Support System*
- **Huang, T. Y.**, Wang, Y. *Multi-stage Production Process Decision-making and Cost Optimization Based on Sampling Inspection *Oct. 2024 – Now*
- **Huang, T. Y.*** "One Young Supporting One Elderly": Leveraging AI Digital Twin Technology to Alleviate Emotional Companionship Challenges for the Elderly **(*X-Institute Enhanced Student Research Training (ESRT) Project, Advisor: Prof. Tang Min*)**
  Keys: *AI Digital Twin Technology, Elderly Companionship, Social Innovation*

Others:

- **Computer Vision Project** under the supervision of Professor Qing Li (Head of the Department of Computing, Hong Kong Polytechnic University) and Professor Xiaoyong Wei (Head of the Department of Computer Science, Sichuan University)
- Smart Delivery System project (**AIoT Digital Twin** and **Software Reinvention**) , Industrial Centre, PolyU

Research Study:

- X-Challenge 2024: Interdisciplinary Cutting-edge Disruptive Innovation Challenge, Tsinghua University TEEP & X-Institute — *July 2024 – Aug. 2024*
  [Track/Study Discription](Chinese) [Official Report of Summit](Chinese)
  Track 9 – How to cultivate innovative talents and promote social equity on a large scale in the era of artificial intelligence?
  - Worked under experts like Dr. Tang Min and Dr. Zuo Xiaolei
  - Proposed solution on cultivating innovative talent with PBL
  - Developed systemic methodologies of social innovation deign
  - Developed the plain of addressing resource misalignment by integrating AI model and data analysis method
  - Represented the research group of Track 9 at X-Fusion Global Innovators Summit 2024

  Keys: *Social Innovation; Project-based Learning; Large Language Model; Personalized recommendation*

- X-Idea 2023: X-Institute International Summer School, Tsinghua University TEEP & X-Institute (**The Most Challenging Project Award**) — *July 2023 – Aug. 2023*
  [Track/Study Discription](Chinese)
  Track 6 – Building Extraterrestrial Ecosystems: From Microbes to Human
  - Worked with experts like Prof. Juan Keymer, Dr. Janneke Noorlag, Dr. Jiliang Hu and Dr. Mo Han
  - Modeled ecological interactions using the Lotka-Volterra Model for simulations the chaos and fractals
  - Designed a portable and machine-learning based microbial rapid substance measured system
  - Designed a microbial neural network by exploring the potential neural networks with island biogeography and controllable microbial neurons

  Keys: *Microbiology; Population Dynamic; Ecology; Machine Learning*

Achievements

- ISE Entry Scholarship for Non-JUPAS Admissions, **Scholarship** in PolyU (2024.10)
- The Most Academic Award, **Research Award** in X-Institute (2023.07)
- Azure AI Fundamentals, **Certification** of Microsoft (2021.12)
- The Hong Kong Polytechnic University Mathematics Gifted Programme, **Advanced Level** Certification by Department of Applied Mathematics, PolyU (2021.12)

Working Experience

PolyVentures Student Assistants, Knowledge Transfer and Entrepreneurship Office, PolyU, HKSAR, China — *Oct. 2024 – Oct. 2025*

Student Assistant, Division of Science, Engineering and Health Studies, CPCE, PolyU, HKSAR, China — *Mar. 2024 – Apr. 2025*

Trainee, Department of Accounting and Information Technology, Royal Plaza Hotel, HKSAR, China — *Dec. 2023 – Jan. 2024*

Volunteer Experience

Student Representative of 45498-PIE, PolyU — *Sept.2024 – Aug. 2025*
Master of Ceremonies, Luncheon celebrating the 75th National Day of the People's Republic of China and the 27th anniversary of Hong Kong reunification, HKFTU — *Oct 2024*
Student Ambassador, CPCE, PolyU — *Oct. 2023 – Oct. 2024*
Student Representative of 8C112-SDS, HKCC, PolyU — *Sept.2023 – Aug. 2024*

Skills & Interests

- Language Skills: Cantonese (Native), Mandarin (Native), English (Proficient)
- Proficient in Python, C/C++, MATLAB, MySQL, SAS, R, MS Office, Colab
- Enjoy: Misics, Cycling, Mathematics, Programming, Philosophy, History, Humanities, Chinese Literature