

# Yunfei Liu

UNDERGRADUATE STUDENT · THE HONG KONG POLYTECHNIC UNIVERSITY

✉ jasonliuyf@gmail.com | 🌐 www.yfliu.net | 📄 yunfei-liu

## Education

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### The Hong Kong Polytechnic University

Kowloon, Hong Kong

B.Sc. (HONS) COMPUTING

Present

- GPA 3.70/4.30 (Top 10%)
- Minor in Applied Mathematics

### University of Cambridge

Cambridge, United Kingdom

SUMMER SCHOOL

Jul. 2021

### Shanghai Jiao Tong University

Shanghai, China

ARTIFICIAL INTELLIGENCE TRAINING CAMP

Jul. 2022

### Chengdu Jiaxiang Foreign Languages School

Chengdu, China

HIGH SCHOOL DIPLOMA

Sep. 2017-Jul, 2020

## Research Experience

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### The Hong Kong Polytechnic University - Department of Computing

Hong Kong

SUPERVISOR: PROF. HENRY CHUN BUN CHAN

Dec. 2020 - Present

- **Research Focus:** Indoor positioning and communications using Bluetooth Low Energy and Ultra-wideband.
- **Duration of Supervision:** Three years during undergraduate studies with Henry Chan.
- **Publications:** Co-authored three publications on the topic. (Another one publication submitted)
- **Primary Responsibilities:**
  - Contributing to research ideas and methodology.
  - Designing and implementing experiments.
  - Collecting and processing data.
  - Assisting in drafting academic papers.
- **Special Skills:**
  - Proficient in building mathematical models.
  - Skilled in coding for simulation and real data processing, mainly using Python.
- **Additional Research Project:** Smart classroom initiative.
  - Objective: Utilizing video analysis of student faces to gauge concentration levels in online classrooms.
  - Role: Project coordinator and team leader.
  - Achievements: Led the design, implementation, and testing phases. Published a conference paper as the first author.
- **Additional Project:** ShopChain.
  - Objective: To revolutionize indoor retail navigation and marketing using indoor positioning.
  - Role: Coordinating and leading the implementation with a diverse team.
  - System Design: Developing a backend system using BLE/UWB for precise indoor positioning and data management.
  - Algorithm Development: Crafting algorithms for effective navigation and targeted promotional strategies.
  - Data Processing: Utilizing real-time data for enhanced navigation and retail marketing.
  - Innovative Solution: Merging sophisticated signal processing with practical retail applications.
  - Recognition: Awarded the Proof-of-Concept Fund 2023 from PolyU.

## University of Waterloo - Department of Civil and Environmental Engineering

Canada

ADVISOR: PROF. PEJOOHAN TAVASSOTI

May 2023 - Aug. 2023

- **Project Focus:** Remote pavement defect detection using drones.
- **Technology Used:** Drones equipped with LiDAR modules for capturing photos and cloud maps of pavements.
- **Objective:** Automating the detection and alerting of pavement defects to reduce costs using computer vision and machine learning.
- **Primary Responsibilities:**
  - Designing methodology and experiments.
  - Conducting experiments and data collection.
  - Writing code for data analysis.
- **Project Description:**
  - Integration of RGB and LiDAR data for pavement defect detection.
  - Conducting tests in a parking lot as a controlled environment for high-resolution image capture.
  - Addressing limitations in current defect detection methods and exploring the use of drones with LiDAR sensors.
  - Part of the Mitacs Globalink Research Internship Program, three months in Summer 2023.
- **Publication in Progress:** First-authored journal paper expected to be submitted in Spring 2024.

## City University of Hong Kong - Department of Accountancy

Hong Kong

ADVISOR: PROF. OLEG KIRIUKHIN

Sep. 2022 - Present

- **Project Focus:** Research in quantitative finance.
- **Key Topics:**
  - Stochastic modeling.
  - Kalman filtering.
  - Stochastic simulations.
  - Analysis of financial time series.
- **Tools and Technologies:**
  - Extensive experience with the "S&P Compustat Fundamentals" database.
  - Proficiency in Python for modeling and simulation.
- **Primary Responsibilities:**
  - Developing models in Python.
  - Implementing these models for data analysis and simulations.
- **Additional Project:** Enhancing Algorithmic Trading Using Large-Language Models: Towards an Autonomous AI-Trading System
- **Overview of Additional Project:**
  - Developing a novel framework that integrates advanced large-language models with algorithmic trading.
  - Aiming to process real-time textual data for improved trading decisions.
  - Focusing on combining textual analysis with high-frequency trading algorithms.
  - Exploring the creation of a self-sufficient, autonomous AI-trading system.

## Teaching Experience

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Fall 2021 COMP1901 Seminars and Topics in Information Technology, Student Assistant

## Publications

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### PUBLISHED

- Y. H. Ho, **Y. Liu**, C. Zhang, Y. Sartayeva and H. C. B. Chan, "Hybrid Learning for Mobile Ad-Hoc Distancing/Positioning Using Bluetooth Low Energy," in IEEE Internet of Things Journal, vol. 10, no. 14, pp. 12293-12307, July 15, 2023, doi: 10.1109/JIOT.2023.3247299.
- Y. Sartayeva, **Y. Liu**, Y. H. Ho and H. C. B. Chan, "Positioning Vectors for Mobile Ad-Hoc Positioning," 2023 IEEE 47th Annual Computers, Software, and Applications Conference (COMPSAC), Torino, Italy, 2023, pp. 512-517, doi: 10.1109/COMPSAC57700.2023.00074.
- Y. Liu**, L. F. Cheung, W. L. Lam and H. C. B. Chan, "Detection of Online Student Behavior Using Emotion and Eye/Head Movement," 2022 IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE), Hung Hom, Hong Kong, 2022, pp. 264-269, doi: 10.1109/TALE54877.2022.00051.
- Y. H. Ho, **Y. Liu**, C. Zhang and H. C. B. Chan, "BlueTrk+ for Tracking Presence and Position," in IEEE Communications Magazine, vol. 59, no. 8, pp. 80-85, August 2021, doi: 10.1109/MCOM.021.2100266.

## UNDER REVIEW

Y. Sartayeva, **Y. Liu**, and H. C. B. Chan, "Positioning Vector Framework for UWB-based Collaborative Positioning," submitted to IEEE Journal on Selected Areas in Communications, 2023.

## WORK IN PROGRESS

**Y. Liu** and P. Tavassoti, "Unmanned Aerial Systems for Advanced Pavement Condition Assessment: Integrating Lidar and Image Processing for Enhanced Infrastructure Management," work-in-progress, to be finished in 2024.

**Y. Liu** and O. Kiriukhin, "Enhancing Algorithmic Trading Using Large-Language Models: Towards an Autonomous AI-Trading System," work-in-progress, to be finished in 2024.

## Awards, Sponsorships & Grants

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2023	<b>HKSAR Government Scholarship</b> , HKSAR Government	<i>HK\$ 80,000</i>
	<b>Mitacs Globalink Research Internship Award</b> , Mitacs	<i>CA\$ 9,000</i>
	<b>The Hong Kong Polytechnic University Scholarship 2022-2023</b> , PolyU	<i>HK\$ 40,000</i>
	<b>HKSAR Government Scholarship - Reaching Out Award</b> , HKSAR Government	<i>HK\$ 10,000</i>
	<b>Dr Winnie S M Tang-PolyU Student Innovation &amp; Entrepreneurship Scholarship</b> , PolyU	<i>HK\$ 10,000</i>
	<b>Commercial Radio 50th Anniversary Scholarship</b> , PolyU	<i>HK\$ 3,000</i>
	<b>Dean's Honours List</b> , PolyU, Faculty of Engineering	
2022	<b>The Hong Kong Polytechnic University Scholarship 2021-2022</b> , PolyU	<i>HK\$ 40,000</i>
	<b>Presidential Student Leadership Award</b> , PolyU	
2021	<b>STEM Internship Scheme - Innovation &amp; Technology Fund</b> , HKSAR Government	<i>HK\$ 11,550</i>
	<b>UG Summer Research Abroad Sponsorship</b> , PolyU	<i>HK\$ 7,500</i>
	<b>Study Abroad Fund</b> , PolyU	<i>HK\$ 5,000</i>
	<b>Proof-of-Concept Fund</b> , PolyU	<i>HK\$ 5,000</i>
	<b>Dean's Honours List</b> , PolyU, Faculty of Engineering	
2019	<b>The First Prize - Chinese Physics Olympiad</b> , Chinese Physics Society	

## Outreach & Professional Development

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### PEER REVIEW

IEEE Internet of Things Journal

### POSTER EXHIBITION

Dec. 2023 **Social Innovation Regional Forum**, ShopChain (Indoor navigation & smart advertising) *Hong Kong*

### SERVICE AND OUTREACH

Present **Hong Kong Amateur Radio Transmitting Society**, Member (Callsign VR2WRR)

Present **China Amateur Radio Club**, Member (Callsign BD8AYK)

### PROGRAMMING LANGUAGES

#### Python

##### ADVANCED PROFICIENCY

- Developed complex data analysis algorithms with extensive experience.
- Skilled for statistical analysis and data visualization using Pandas, NumPy, SciPy, Matplotlib.
- Created predictive machine learning models with scikit-learn, and TensorFlow in prior research publications.

## **C/C++**

### **PROFESSIONAL PROFICIENCY**

- Proficient in C/C++, honed through hands-on course projects and extensive programming assignments.
- Experienced in microcontroller programming with STM32, Arduino, and Raspberry Pi platforms.
- Successfully developed diverse projects: an ESP8266-based IoT device, an Arduino-driven robot controller, and a Raspberry Pi-based router.

## **Front-end**

### **PROFESSIONAL PROFICIENCY**

- Developed personal, retail, and multilingual audio assistant websites using HTML, CSS, PHP, and JavaScript.
- Skilled in Vue, React, Node, and Jekyll, enhancing front-end functionality and user experience in diverse web projects.

## **SQL**

### **PROFESSIONAL PROFICIENCY**

- Designed smart city traffic, hospital patient management, and e-commerce retail databases.
- Specialized in database architecture, query optimization, and data integrity in varied sectors with MySQL, Oracle SQL, SQLite.

## **MATLAB**

### **INTERMEDIATE PROFICIENCY**

- Utilized MATLAB for course projects, focusing on complex mathematical modeling and algorithm development.
- Applied MATLAB in research for data analysis and calculations, enhancing accuracy and efficiency.