

## HIGHLIGHT

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- **Education:** BEng First Class Honours (CGPA: 4.05/4.3), MPhil in Deep Learning (Feb 2026)
- **Research:** Generative diffusion models, sequence modeling; 3 papers in IEEE TIP/TCE, 1 in ACM MMSports
- **Awards:** Received over 10 prestigious awards including HKSAR Government Scholarship (2019-2021) and HSBC Scholarship for academic excellence
- **Current:** Building quant trading system with ML; exploring prediction market alpha detection

## EDUCATION

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- **BEng in Electronic and Information Engineering** The Hong Kong Polytechnic University  
*GPA: 4.05/4.3 (First Class Honours)* Sep 2017 - Aug 2021
  - **Course:** Computer Vision and Pattern Recognition (A+), surveillance Studies and Technologies (A+), Digital Signal Processing (A+), Mathematics I, II (A+, A+), Image and Audio Processing (A), Probability and Engineering Statistics (A)
- **Master of Philosophy in Electrical and Electronic Engineering** The Hong Kong Polytechnic University  
*GPA: 3.74/4.3* Sep 2022 - Feb 2026
  - **Research Topic:** Image Enlightening with Deep Learning for Playground Lighting Enhancement with Action Recognition
  - **Supervisors:** Prof. Yui-Lam Chan (MIEEE) and Prof. SIU Wan-Chi (Life-FIEEE)
  - **Funding:** The study is fully supported by Saint Francis University

## RESEARCH INTERESTS

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- **Machine Learning:** Deep Learning, Generative Models, Sequence Modeling, Harness Engineering (agent orchestration, verification loops)
- **Applications:** Financial Signal Extraction, Time-series Prediction, Statistical Modeling, Prediction Markets

## RESEARCH

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- **Generative Diffusion Models with Learnable Latent Variables**  
*Feb 2023 - Aug 2025*
  - **Research Focus:** Proposed novel generative diffusion models for data synthesis with mathematical innovations. Key contributions include: (1) Anchoring Diffusion Probabilistic Models - introduced learnable anchor mean  $\mathcal{N}(m_t, I)$  extending standard  $\mathcal{N}(0, I)$  noise, providing additional degrees of freedom for better data distribution modeling; developed Dynamical Regulated Diffusion Anchoring (DRDA) mechanism to anchor the enhancement process and ensure fidelity to input; (2) Back Projection Generative Strategy - developed degradation-aware diffusion framework with emphasis on statistical fidelity modeling between normal/low-light domains, enabling high-quality synthetic data generation for robust model training. Created LOL-Diff, a large-scale synthetic dataset to address data scarcity in low-light image enhancement tasks.
  - **Publication:**
    - [1] **C.-Y. Chan**, W.-C. Siu, Y.-H. Chan, and H. A. Chan, "AnlightenDiff: Anchoring Diffusion Probabilistic Models on Low Light Image Enhancement", in IEEE Transactions on Image Processing, vol. 33, pp. 6324-6339, 2024, doi: 10.1109/TIP.2024.3486610.
    - [2] **C.-Y. Chan**, W.-C. Siu, Y.-H. Chan, and H. A. Chan, "Back Projection Generative Strategy for Low and Normal Light Image Pairs With Enhanced Statistical Fidelity and Diversity," in IEEE Transactions on Consumer Electronics, vol. 71, no. 2, pp. 3575-3586, May 2025, doi: 10.1109/TCE.2024.3516366.
    - [3] **C.-Y. Chan**, W.-C. Siu, Y.-H. Chan, and H. A. Chan, "Generative Strategy for Low and Normal Light Image Pairs with Enhanced Statistical Fidelity," 2024 IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, NV, USA, 2024, pp. 1-3, doi: 10.1109/ICCE59016.2024.10444437.
- **Spatiotemporal Trajectory Modeling for Action Prediction**  
*Jan 2022 - Dec 2022*
  - **Research Focus:** Developed sequence-to-sequence models for multi-object trajectory prediction in sports video analytics. Built state estimation systems to track player and ball positions across continuous video streams and forecast future events (goals, offsides, fouls) in real-time. Proposed novel attention mechanisms for capturing long-range temporal dependencies and multi-scale feature fusion. Achieved sub-second latency for real-time event prediction, demonstrating feasibility for live broadcast applications.
  - **Publication:**
    - [4] **C.-Y. Chan**, C.-C. Hui, W.-C. Siu, S.-w. Chan, and H. A. Chan, "To Start Automatic Commentary of Soccer Game with Mixed Spatial and Temporal Attention," in TENCON 2022-2022 IEEE Region 10 Conference (TENCON), Nov. 2022, IEEE.
    - [5] W.-C. Siu, H. A. Chan, S.-W. Chan, W.-H. Cheng, B.-C. Yang, **C.-Y. Chan**, C.-C. Hui, and R. Salahudeen, "On the completion of automatic football game commentary system with deep learning," in Proc. SPIE International Workshop on Advanced Imaging Technology (IWAIT), Mar. 2023, pp. 125920H, doi: 10.1117/12.2668398.
    - [6] S. Giancola et al. (**C.-Y. Chan**), "SoccerNet 2022 Challenges Results," in Proceedings of the 5th International ACM Workshop on Multimedia Content Analysis in Sports, in MMSports '22., 2022, pp. 75-86. doi: 10.1145/3552437.3558545

## PROJECTS

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### ForgeBook: Self-Built Quant Trading System

- *Feb 2026 - Present*
  - **Architecture:** End-to-end quantitative trading system with four core components: (1) ForgeDB - TimescaleDB time-series database for cross-exchange trading pairs with database optimizations including compression, indexing, cold/hot data tiering, continuous aggregates, and vacuum scheduling; (2) ForgeBook - event-driven algorithmic trading platform built on NautilusTrader with production-grade streaming (test 10+ years of data in minutes, constant memory), risk checks, and identical code from backtest to live; (3) Self-hosted LLM inference via vLLM for strategy research; (4) ForgeBookAuto - LLM-driven automated strategy discovery using Autoresearch framework.
  - **Statistical Analysis:** Built statistical analysis pipelines for trading pairs; implemented feature engineering, correlation analysis for cointegration detection, and volatility modeling.
  - **Real-time Systems:** Live trading with sub-second market data ingestion; supports paper trading for risk-free strategy validation
  - **Key Skills:** TimescaleDB database administration (compression, indexing, cold/hot tiering, vacuum), event-driven backtesting framework, self-hosted LLM inference deployment, agent-based strategy discovery framework

## HONORS AND AWARDS

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- **HSBC Greater Bay Area (Hong Kong) Scholarship**  
*The Hongkong and Shanghai Banking Corporation* 2021
- **ASM Pacific Technology Scholarship**  
*The Hong Kong Polytechnic University* 2021
- **Mitsubishi Electric (Hong Kong) Limited Scholarship**  
*The Hong Kong Polytechnic University* 2021
- **Best Academic Performance Award**  
*The Hong Kong Polytechnic University* 2021
- **Outstanding Student Award**  
*The Hong Kong Polytechnic University* 2021
- **Hong Kong Special Administrative Region Government Scholarship**  
*Hong Kong Special Administrative Region Government* 2019-2021
- **HSBC Hong Kong Scholarship**  
*The Hong Kong Polytechnic University* 2020
- **Mitsubishi Electric (Hong Kong) Limited Scholarship**  
*The Hong Kong Polytechnic University* 2020
- **VTech Group of Companies Scholarship**  
*The Hong Kong Polytechnic University* 2020
- **Gold Award - Be a Global Citizen Campaign**  
*Chinese YMCA of Hong Kong* 2019
- **Dr. Ng Tat-lun Memorial Scholarship**  
*The Hong Kong Polytechnic University* 2018
- **Dean's Honours List**  
*The Hong Kong Polytechnic University* 2018-2021
- **Best (Semester) GPA Award**  
*The Hong Kong Polytechnic University* 2017-2021

## WORK EXPERIENCE

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- **Research Assistant** Saint Francis University  
*Sep 2021 - Sep 2025*
  - **Research Infrastructure:** Purchased and managed GPU server cluster (12+ nodes); maintained electricity and air conditioning systems for stable computing environment
  - **Procurement:** Handled hardware purchase tender processes from evaluation to approval; evaluated specifications including NVIDIA A100 GPUs with NVLink InfiniBand switches for high-performance cluster

## TECHNICAL SKILLS

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- **ML/AI:** PyTorch, Diffusion Models, Transformers, LLMs
- **Mathematics:** Probability Theory, Bayesian Statistics, Linear Algebra, Optimization
- **Trading & Programming:** Python, SQL, TimescaleDB, NautilusTrader, scikit-learn, LaTeX
- **Infrastructure:** GPU cluster (12+ nodes), Linux, Git, Podman, Tailscale, Cloudflare