# Po-Wei (George) HUANG

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## EDUCATION

**National University of Singapore**      **Aug 2020 - Jun 2023**

*Bachelor of Computing (Computer Science) with Honours (Highest Distinction)* (GPA 4.81/5.00)
- Second Major in Mathematics
- Turing Programme (Honours Research Specialization Program)
- Study Focus Area: Algorithm and Theory / Artificial Intelligence

**Nanyang Technological University**      **Aug 2019 - May 2020**

*Computing and Business Undergraduate Student* (GPA 4.91/5.00(CS) 4.74/5.00(BUSINESS))
- Incomplete; transferred to NUS by end of freshman year

## RESEARCH EXPERIENCE

**Research Assistant (Quantum Algorithms)**      **May 2023 - Present**

*Principal Investigator: Asst. Prof. Patrick Rebentrost* (CENTRE FOR QUANTUM TECHNOLOGIES)
- Investigating hybrid quantum-classical algorithms for quantum machine learning with provable convergence.
- Exploring fault-tolerant quantum algorithms for game theoretical problems such as market equilibrium.

**Bachelor's Dissertation**      **Aug 2022 - Apr 2023**

*Supervisor: Asst. Prof. Patrick Rebentrost, Prof. Rahul Jain* (CENTRE FOR QUANTUM TECHNOLOGIES)
- Proposed "post-variational" strategies that convert quantum optimization to convex optimization problems.
- Proposed different heuristics for selecting Ansätze for problem-agnostic post-variational neural networks.
- Conducted error analysis of such strategies and provided upper bounds of quantum measurements required.

**Undergraduate Research Opportunities Programme**      **Apr 2021 - Jul 2022**

*Supervisor: Assoc. Prof. Min-Yen Kan* (WEB IR/NLP GROUP @ NUS)
- Optimized document structure extraction performance by 10% for marco-F1 against a previous model.
- Adapted sliding attention framework to induce quadratic speedup in runtime for transformer autoencoders.
- Applied data augmentation for semi-supervised training to increase model robustness to out-of-domain data.

**Student Researcher**      **Sep 2018 - May 2019**

*Supervisor: Prof. Hong-Ping Lin* (NCKU CHEMISTRY)
- Synthesized porous bio-carbon by carbonizing pyrolysis oil mixtures as an alternate material for supercapacitors.
- Experimented on the effect of micropores and mesopores on the capacitance and resistance via cyclic voltammetry.

## PREPRINTS AND MANUSCRIPTS

**P.-W. Huang**, P. Rebentrost. Quantum algorithm for large-scale linear Fisher market equilibrium computation. *In preparation.*

**P.-W. Huang**, X. Li, K. Koor, P. Rebentrost (2023). Hybrid quantum-classical and quantum-inspired classical algorithms for solving banded circulant linear systems. *arXiv:2309.11451 [quant-ph], Under review.*

**P.-W. Huang**, P. Rebentrost (2023). Post-variational quantum neural networks. *arXiv:2307.10560 [quant-ph], Under review.*

## PEER-REVIEWED PUBLICATIONS

**P.-W. Huang** (2022). Domain specific augmentations as low cost teachers for large students. In *Proceedings of the First Workshop on Information Extraction from Scientific Publications*, pages 84–90, Online. Association for Computational Linguistics.

**P.-W. Huang**, A. Ramesh Kashyap, Y. Qin, Y. Yang, and M.-Y. Kan (2022). Lightweight contextual logical structure recovery. In *Proceedings of the Third Workshop on Scholarly Document Processing*, pages 37–48, Gyeongju, Republic of Korea. Association for Computational Linguistics.

## Talks and posters

"**Hybrid quantum-classical and quantum-inspired classical algorithms for solving banded circulant linear systems.**" *Poster presentation at QIP 2024.* (TBC)
"**Post-variational quantum neural networks.**" *Contributed talk at QTML 2023.* (Nov 22, 2023)
"**Post-variational strategies for quantum machine learning.**" *QML Seminar, QAISG.* (Oct 24, 2023)
"**Post-variational quantum neural networks.**" *CS Seminar, Centre for Quantum Technologies.* (Aug 30, 2023)
"**Domain specific augmentations as low cost teachers for large students.**" *Contributed talk at First Workshop on Information Extraction from Scientific Publications @ AACL-IJCNLP.* (Nov 21, 2022)
"**Lightweight contextual logical structure recovery.**" *Poster presentation at Third Workshop for Scientific Document Processing @ COLING* (Oct 17, 2022)

## Achievements and Awards

**Degree Honours – Highest Distinction** *(2023)*

**Certificate of Distinction – Algorithms & Theory / Artificial Intelligence** *(2023)*

**SoC Take on the World Award x2 (Funding for participation for international events)** *(2023)*

**Top Students for Design and Analysis of Algorithms / Optimisation Algorithms** *(2022, 2023)*

**Dean's List** *(Fall 2020, Spring 2021, Fall 2022)*

**Honour List of Student Tutors** *(2022)*

## Teaching Experience

**NUS School of Computing**                                               **Jan 2021 - Apr 2023**
*Teaching Assistant* (Data Structures and Algorithms)
- Provided algorithm design consultation and pseudocode fine-tuning for 120+ students over 6 semesters.
- Graded programming assignments for 200+ students over 7 semesters.
- Designed lab materials for Java programming and data structure applications.

## Industrial Experience

**Continental Automotive Singapore**                                      **May 2022 - Jul 2022**
*Software Engineer Intern* (Central Engineering Department)
- Developed an internal tool to track coding issues with the purpose of reducing manual time.
- Designed heuristic-based algorithm for string matching for issue detection.

**Taiwan Semiconductor Manufacturing Company (TSMC)**                     **Jul 2021 - Sep 2021**
*Software Engineering Intern* (Equipment Edge Computing Team)
- Facilitated database transfer from SQL to NoSQL increasing read/write access speed by 10x.
- Deployed Kubernetes hosted Cassandra database with Spring backend access and Prometheus monitor system.

## Academic Services

Reviewer for Int. J. Quantum Information
Sub-reviewer for QTML 2023, QIP 2024, Advanced Quantum Technologies

## Extracurricular Activities

**NUS Investment Society**                                                **Sep 2020 - Jun 2021**
*Quantitative Engineer* (Quantitative Finance Team)
- Conducted analysis on quantitative personal portfolio optimization with mulit-factored regression.

**NUS Students for the Exploration and Development Society**              **Oct 2020 - May 2021**
*Science Development Engineer* (Mars Rover Team)
- Designed drill system and sensor integration for Mars rover prototype.

## Skills

**Spoken Languages:** English (full professional proficiency), Chinese (native)
**Programming Languages:** C/C++, Java, Python
**Quantum Computing:** Qiskit, Pennylane