# 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**

*BEng/BBus Double Degree in Business and Computing* (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 capcitance and resistance via cyclic voltammetry.

## Preprints

**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], submitted to QIP 2024 and npj Quantum Information.*

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

## Publications

**P.-W. Huang** (2022). Domain specific augmentations as low cost teachers for large students. *Proceedings of the First Workshop on Information Extraction from Scientific Publications (WIESP@AACL-IJCNLP2022).*

**P.-W. Huang**, A. Ramesh Kashyap, Y. Qin, Y. Yang, and M.-Y. Kan (2022). Lightweight contextual logical structure recovery. *Proceedings of the Third Workshop on Scholarly Document Processing (SDP@COLING2022).*

## Talks

**"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)
**"Hybrid quantum-classical neural networks."** *Bachelor's Dissertation Presentation, NUS.* (Apr 17, 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)
**"Neural logical recovery for scholarly articles."** *Undergraduate Research Presentation, NUS.* (Apr 18, 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.
- Participated in Agile ceremonies and familiarized Agile workflows.

**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.
- Created Spring-based backend of the existing dashboard to streamline database accessing procedures.
- Deployed cluster-balanced Cassandra database with Prometheus and Grafana interface for easy monitoring.

## Academic Services

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

## Standard Test Scores

**TOEFL iBT:** 118/120 (Jun 2018; expired)
**GRE Physics Subject Test:** 990/990 (Oct 2023)

## Skills

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