Po-Wei (George) HUANG

📞 +65 8891 3219 | ✉ huangpowei22@u.nus.edu | 🔗 huangpowei | 🔗 georgepwhuang.github.io | 🎓 Google Scholar

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 optimization problems with a provable speedup.

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 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]*

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

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**
Information Technology 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, TAMC 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