NHAT ANH NGHIEM

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EDUCATION

Ph.D, C.N.Yang Institute for Theoretical Physics   *August 2021 - now*
Advisor: Prof. Tzu-Chieh Wei
Thesis Committe: Prof. Xianfeng Gu, Prof. Paul Goldbart, Prof. Eden Figueroa
Area of Study: Quantum Computation

Master of Arts (M.S), SUNY Stony Brook   *December 2023*

Bachelor of Science (B.S with Honors), SUNY Stony Brook   *May 2021*
Major: Physics and Applied Mathematics & Statistics

RESEARCH & WORKING EXPERIENCE

C.N.Yang Institute for Theoretical Physics   *Fall 2018-Present*
Undergraduate & Graduate Researcher, Quantum Information Science Group
Advisor: Prof. Tzu-Chieh Wei

Department of Physics and Astronomy   *Fall 2021-Present*
Teaching Assistant

Los Alamos National Laboratory   *Summer 2021*
Summer Student, Quantum Computing School
Advisor: Dr. Marco Cerezo, Dr. Patrick J. Coles

Brookaven National Laboratory   *Summer 2019/ Summer 2020*
Summer Researcher, Quantum Computing Group, CSI
Advisor: Dr. Layla Hormozi

Department of Physics and Astronomy   *Spring 2020-Present*
Undergraduate Researcher, Condensed Matter Physics Group
Advisor: Prof. Phillip Allen

OTHERS

Research Talks/Activities:

"Quantum Algorithm for Homology Detection", talk at Quantum 2.0 Conference

"Machine Learning from Classical and Quantum Perspectives", **Nhat Anh Nghiem Vu** and Peter M. Djuric, Seminar Talk, Institute for Advanced Computational Science (IACS), Stony Brook University, 2019

"Unsupervised and Supervised Learning with Quantum Computer", **Nhat Anh Nghiem Vu**, Predrag Krstic, Research Poster, IACS, Stony Brook University, 2019

HONORS AND AWARDS

IBM Quantum Computing Internship (2024)

Quantum Computing Fellowship, Los Alamos National Laboratory (2021)

Sigma Pi Sigma, Stony Brook University (2020)

Undergraduate Research Awards (2020)

Second Grand Prize, National Physics Olympiads, Vietnam (2016)

SKILLS & OTHERS

Languages	Vietnamese, English
Programming	Python (**very familiar**), Matlab, C, C++, Fortran, Mathematica (**familiar**)
Framework	Pytorch, IBMQ
Citizenship	Vietnamese

PUBLICATION & PAPERS

1. "Quantum Algorithm For Solving Nonlinear Algebraic Equations", **Nhat A. Nghiem** and Tzu-Chieh Wei *arXiv:2404.03810*, to be submitted to Quantum

2. "Atomic Instability and Explosion in Fractal Space", **Nhat A. Nghiem**, Van H. Do and Trung V. Phan *Preprint Available Upon Request*

3. "Alternative Quantum Algorithm for Estimating Betti Numbers", **Nhat A. Nghiem** *arXiv:2403.04686*, submitted to Journal of Physics A: Mathematical and Theoretical

4. "Improved Method for Eigenvalues Estimation and Quantum Gradient Descent", **Nhat A. Nghiem** and Tzu-Chieh Wei *arXiv:2312.14786* (submitted to Quantum)

5. "Quantum Algorithm for Estimating Betti Number Using Cohomology Approach", **Nhat A. Nghiem**, Xianfeng David Gu, Tzu-Chieh Wei. *arXiv:2309.10800*, submitted to PRX Quantum

6. "Quantum Algorithm for Computing Distance Between Subspaces", **Nhat A. Nghiem** *arXiv:2308.15432*, accepted to Physics Letter A

7. "Improved Method for Quantum Matrix Multiplication", **Nhat A. Nghiem** and Tzu-Chieh Wei, *Quantum Information Processing 22 (8), 299*

8. "Quantum Algorithm for Estimating Largest Absolute Eigenvalues", **Nhat A. Nghiem** and Tzu-Chieh Wei. *Physics Letters A 488, 129138*

9. "Quantum Algorithm for Detecting Homology Class of Closed Curve", **Nhat A. Nghiem**, Xianfeng David Gu, Tzu-Chieh Wei. *SciPost Physics 15 (2), 049*

10. "Subtleties in The Trainability Of Quantum Machine Learning Models", Supanut Thanaslip, Samson Wang, **Nhat A. Nghiem**, Patrick J. Coles, M. Cerezo, *Quantum Machine Intelligence 5 (1), 21*

11. "A Unified Framework for Quantum Classification", **Nhat A. Nghiem**, Samuel Yen-Chi Chen and Tzu-Chieh Wei, *Physical Review Research 2021*

12. "Heat Pulse Propagation and Nonlocal Phonon Heat Transport in One-Dimensional Harmonic Chains", Philip B. Allen and **Nhat A. Nghiem**, *Physical Review B, 2022*

13. "Quantum Algorithm for Testing Convexity of Function", **Nhat A. Nghiem** and Tzu-Chieh Wei (to be announced)

14. "Improved Quantum Power Method and Numerical Integration Using Quantum Singular Value Transformation", **Nhat A. Nghiem**, Hiroki Sukeno, Shuyu Zhang and Tzu-Chieh Wei (to be announced)

15. "Quantum Algorithm for Finding Periodic Trajectories", **Nhat A. Nghiem**, and Trung V. Phan (ongoing)

16. "Quantum Algorithm for Matrix Product State-Based Numerical Simulation", **Nhat A. Nghiem**, Shuyu Zhang, Hiroki Sukeno, and Tzu-Chieh Wei (ongoing)

17. "Quantum Algorithm for Simulating Biological System", **Nhat A. Nghiem**, Van H. Do and Trung V. Phan (ongoing)

18. "Quantum Algorithm for Harmonic Mapping", **Nhat A. Nghiem**, Xianfeng David Gu, Tzu-Chieh Wei. (ongoing)

19. "Quantum Algorithm for Conformal Mapping and Solving Partial Differential Equation on Surface", **Nhat A. Nghiem**, Xianfeng David Gu, Tzu-Chieh Wei. (ongoing)

20. "Quantum Algorithm for Tracking Homology Generators and Topological Data Analysis of Quantum System", **Nhat A. Nghiem** (ongoing)

21. "Quantum Algorithm for Computing Topology of Manifolds", **Nhat A. Nghiem**, Xianfeng David Gu and Tzu-Chieh Wei (ongoing)

22. "A Method for Joint Estimation of Observables Based on Quantum Singular Transformation Framework", **Nhat A. Nghiem** and Tzu-Chieh Wei (ongoing)

23. "Simpler Method for Quantum Gradient Descent", **Nhat A. Nghiem** and Tzu-Chieh Wei (ongoing)

24. "Polynomial Reduction and Algebraic Geometry", **Nhat A. Nghiem** (ongoing)

25. "Quantum Algorithm for Numerical Renormalization Group Method", **Nhat A. Nghiem**, Tzu-Chieh Wei, Van-Duy Nguyen and Hoa Nghiem (ongoing)