Quoc Chuong NGUYEN

CURRICULUM VITAE

ADDRESS	: Buffalo City, New York, the US
ORCID	: 0000-0002-3260-9967
EMAIL	: chuong.nguyen1413017@gmail.com
GOOGLE SCHOLAR	: https://scholar.google.com/citations?user=embX1-gAAAAJ&hl=en
GITHUB	: https://github.com/ChuongQuoc1413017

RESEARCH INTEREST

Mathematics	: Game Theory · Network Science · Category Theory
Computer Science	: Complexity Theory · Reinforcement Learning
Quantum Computation	: Quantum Algorithm · Quantum Artificial Intelligence

EDUCATION & TRAINING

Education

2023 - NOW — **Ph.D student at University at Buffalo**, New York City, the US
Major: Applied Mathematics
CGPA: 3.945/4.0
Advisor: Prof. Naoki Masuda

2014 - 2018 — **Bachelor at University of Natural Sciences (HCMUS)**
Vietnam National University, Ho Chi Minh City (VNU-HCM), Vietnam
Major: Theoretical Physics
CGPA: 8.27/10 or 3.5/4.0 (top 2% over 300 students)
Graduated Seminar: Simulation of Quantum Many-body Dynamics using the Monte-Carlo algorithm with Python (Non-Thesis option)

PUBLICATION

Published

- **Quoc Chuong Nguyen** et al. "Qsun: an open-source platform towards practical quantum machine learning applications", Machine Learning: Science and Technology, 2022.

Preprint

- **Quoc Chuong Nguyen** et al. "Hybridising Reinforcement Learning and Heuristics for Hierarchical Directed Arc Routing Problems", arXiv:2501.00852, 2025.

- **Quoc Chuong Nguyen** et al. "FQsun: A Configurable Wave Function-Based Quantum Emulator for Power-Efficient Quantum Simulations", arXiv:2411.04471, 2024.

- Quoc Chuong Nguyen. "Monte Carlo Analysis of Boid Simulations with Obstacles: A Physics-Based Perspective", arXiv:2412.10420, 2024

- **Quoc Chuong Nguyen** and Trung Kien Le. "Toward a comprehensive simulation framework for hypergraphs: a Python-base approach", arXiv:2401.03917, 2024.

Academic Experience

Recent Remote Collaborations

- May 2024 - Now: In collaboration with Prof. Hy Truong Son (University of Alabama at Birmingham, US) and Prof. Thu Huong Dang (Lancaster University, England)
    - Combinatorial Optimization, Operation Research: Solving the Hierarchical Directed Capacitated Arc Routing Problem with heuristic algorithms

Software

- HyperRD: Simulation and analysis of random and dynamical hypergraph
    - https://github.com/ChuongQuoc1413017/Hypergraph_RD
- QSun: Quantum platform to simulate quantum circuits using NumPy array
    - https://github.com/ChuongQuoc1413017/Quantum_Virtual_Machine
- Quantum Evolutionary Algorithm: Optimize quantum circuits' structure using Evolutionary Algorithms
    - https://github.com/ChuongQuoc1413017/Quantum_Evolutionary_Algorithm

Lecture Notes

- Summary of Lie Algebra in Particle Physics (Vietnamese)
    - https://github.com/ChuongQuoc1413017/Note/blob/main/Lie%20Algebra.pdf
- Quantum Machine Learning at $\langle QCS | 2021 \rangle$
    - https://github.com/ChuongQuoc1413017/Note/blob/main/QML_Lecture_Note.pdf

Teaching

- Jan 2024 - May 2024: Mentor of Directed Reading Project program: guide undergraduate students studying computational thinking and algorithms
- Aug 2023 - Now: Teaching Assistant at the University at Buffalo, NY in: Calculus, Linear Algebra, and Stochastic Processes

Talks/Posters at Conferences, Workshops, and Schools

"Quantum Machine Learning" at Quantum Computing School - $\langle QCS\,\|\,2021 \rangle$, Vietnam	04 Dec - 12 Dec 2021 Contributory Lecturer
"Half-wormhole solutions & Black Hole singularity" at The 46th Vietnam Conference on Theoretical Physics (VCTP-46)	13 Oct 2021 Poster

Honors & Awards

Academic incentive scholarships (University of Science, HCMUS) Description: for students with the highest GPA and contributions to extracurricular activities for society each semester.	Nov 2014 - Nov 2018 8 times

Conferences, Workshops, and Schools Attended

VIASM-ICTP Summer School in Group Theory and Representation Theory	9 - 21 Aug 2022
The Mathematics of Interactive Bose Gas 2022	1 - 6 Aug 2022
Topological Quantum Electrons Interacting In-persons	10 - 16 July 2022
Spring School on Superstring Theory and Related Topics	9 - 13 May 2022
The 10th International Workshop on Solid-State Quantum Computing	29 Nov - 1 Dec 2021
The 2021 Vietnam Operations Research Network Meeting	26 - 27 Nov 2021
Vietnam School on Neutrinos - VSON2021	29 Aug - 09 Sep 2021
Vietnam - USA Joint Mathematical Meeting - VNUS 2019	10 - 13 Jun 2019
Asia-Europe-Pacific School of High-Energy Physics, Vietnam	12 - 25 Sep 2018

Working Experience

Research

QuantumLab - Ho Chi Minh City Institute of Physics, Vietnam Website: https://lantrann.github.io/QuantumLab-HCMIP Position: Affiliated Member Job Description: develop quantum machine learning applications in chemistry and quantum metrology	Sep 2021 - May 2022
Research Assistant for Dr. Hung Nguyen, Vietnam Position: Research Assistant Job Description: develop Qsun (Quantum Computing simulator, Python) and Variational Quantum Eigensolver's applications in machine learning	Nov 2019 - Apr 2023

Education

FUNiX Co. Ltd., Vietnam Position: Collaborative Assistant Job Description: develop machine learning & data science courses, translate courses' contents from Vietnamese to English, fix coding bugs	Jul 2020 - Nov 2021
Saigon Scientists Co., Vietnam Position: Research & Development Assistant Job Description: develop STEM lessons, translate courses' contents from Vietnamese to English, project management	Jul 2018 - Jul 2019

Languages & Computer Skills

Vietnamese:	Mother tongue
English:	Intermediate (IELTS Band Score 6.5): L: 6.0 - R: 8.0 - W: 6.0 - S: 5.5
Programming languages:	Proficient: Python, NetworkX, Qiskit, Pennylane Basic: Mathematica, Matlab, R, LaTeX, Haskell, Lean

Certifications

- GRE General Test: 317/340 (75th percentile)
  - Quant: 167/170 (87th percentile), Verbal: 150/170, AW: 3.5/6.0

- Introduction to Discrete Mathematics for Computer Science Specialization (offered by University of California San Diego) on *Mathematical Thinking, Probability, Combinatorics, and Graph Theory* at Coursera in 2022, Credential ID: ZDL-RFFSJ6H8N.

- Introduction to Logic and Critical Thinking Specialization (offered by Duke University) on *Argument Analysis, Deductive Reasoning, Inductive Reasoning, and Fallacies* at Coursera in 2022, Credential ID: PNT6RQ3G9Q89.

- Mind and Machine Specialization (offered by University of Colorado Boulder) on *Cognitive Science and Artificial Intelligence* at Coursera in 2022, Credential ID: HNTZFNDS4LU7.

- Writing in the Sciences (offered by Stanford University) at Coursera in 2022, Graded 100/100 with Honors, Credential ID: HTJ5EJQ2VZ2F.

- Game Theory (offered by Stanford University and The University of British Columbia) at Coursera in 2022, Graded 100/100, Credential ID: SUFX9JZ2YTSA.

- Research Writing in the Sciences course at INASP, the United Kingdom (International Network for Advancing Science and Policy) in 2022, Graded Merit.

- Machine Learning courses on *Regression, Classification, and Clustering* at FUNiX, Vietnam (an online learning platform for Vietnamese) in 2020, Graded 10/10.

- ERASMUS+ course on *Symmetry and Invariance in Physics* (a short course about symmetries and Noether's theorem taught by Prof. Amaury Mouchet from François Rabelais University, France, and organized at HCMUS) in 2016, Non-Graded.

Referee for Peer-Reviewed Journals

- Quantum Machine Intelligence
- Scientific Reports

References

Prof. Naoki Masuda (Google Scholar)
Department of Mathematics
University at Buffalo, US
Email: naokimas@gmail.com

Prof. Long Tran-Thanh (Google Scholar)
Human-Agent Learning (HAL) lab
University of Warwick, England
Email: long.tran-thanh@warwick.ac.uk

Dr. Hung Nguyen (Google Scholar)
Nano and Energy Center
University of Science, VNU Hanoi, Vietnam
Email: hungngq@hus.edu.vn

Dr. Lan Tran (Google Scholar)
Department of Physics
University of Natural Sciences, HCMC, Vienam
Email: tnlan@hcmus.edu.vn

Prof. Le Ho (Google Scholar)
QuantumLab-HCMIP
Tohoku University, Japan
Email: binho@fris.tohoku.ac.jp

Prof. Hy Truong Son (Google Scholar)
Department of Computer Science
University of Alabama at Birmingham, US
Email: thy@uab.edu

Prof. Thu Huong Dang (Google Scholar)
Department of Management Science
Lancaster University, England
Email: t.h.dang@lancaster.ac.uk