Kamphol (Best) Akkaravarawong

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AWARDS

Gold medal
42nd International Physics Olympiad

Bronze medal
12nd Asian Physics Olympiad

Leo Felicov fellowship
UC Berkeley's Department of Physics fellowship

Department scholarship
Awarded to 4 first-year Berkeley's physics graduate students

PUBLICATION

4 first-authored papers
See more at kakkarav.com

SKILLS

Data analysis, Data visualization, Markov Chain Monte Carlo (MCMC), High-performance computing, containerization and virtualization

Programming Laguages
Python • Julia • JavaScript
C • HTML/CSS • LaTeX
Unix commands • shell scripts

Tools/Packages
numpy, scipy, pandas, scikit-learn
Jupyter, PySpark
Git • SQL
Docker • Proxmox • Git
Mathematica • MATLAB

COURSEWORK

Data structures & algorithms
Statistics/Probability
Machine learning
Quantum mechanics
Quantum Information
Quantum field theory
Linear algebra
Multivariable calculus
Differential equations
Statistical mechanics

LANGUAGES

English (fluent), Thai (native), Mandarin Chinese (beginner)

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY | 2016 - 2023

Ph.D. in Physics, Theoretical Condensed Matter physics
Advisor: Professor Norman Yao

MASSACHUSETTS INSTITUTE OF TECHNOLOGY | 2012 - 2016

B.S. in Physics
GPA: 5.0/5.0

EXPERIENCE

GRADUATE STUDENT RESEARCHER

UC Berkeley, CA | Aug 2016 - Dec 2023

Modeling: I used a quantum model to predict the effective interaction between magnetic atoms on a thin-film superconductor.

- Performed the third-order perturbation calculation to obtain an analytic solution and estimated the error bound for the interaction strength.
- Developed a new measurement technique utilizing microwave spectroscopy.
- Collaborated with experimentalists to design a realistic experimental scheme to create a quantum simulator from such system.

Numerical Simulation : I used Monte Carlo simulations to explain the effect of random potential on novel quantum materials.

- Developed an end-to-end Quantum Monte Carlo engine and data pipeline from scratch.
- Deployed parallel MCMC simulations on Slurm clusters to simulate quantum system with 30k lattice sites.
- Developed a Monte Carlo update that sped up the simulation time by $\sim$ 300%.
- Analyzed $\sim$ 1.3M clean data points of floats to classify phases of matter, leading to discovery of a novel phase and prediction of instability in real materials.

GRADUATE STUDENT INSTRUCTOR

UC Berkeley, CA | Aug 2016 - Dec 2023

- Taught 2 advanced *graduate* courses (40 students each) and 3 introductory *undergraduate* course (40 students each).
- Mentored 4 undergraduate students and 2 junior graduate students.

UNDERGRADUATE RESEARCH ASSISTANT

Jarrillo-Herrero lab | MIT, MA | Jun 2013 - Jun 2016

- Designed quantum devices for graphene and transition metal dichalcogenides.
- Independently fabricated quantum devices using electron-beam lithography and pulsed laser deposition.

SIDE PROJECTS

Self-Hosting

- Utilized containerization and virtualization to self-host cloud services on my personal Linux servers.
- Implemented an encrypted backup solution and automated the maintenance routine.

Investing

- Evaluated and backtested my personal investment on various assets.