

Kamphol (Best) Akkaravarawong

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SUMMARY

Theoretical physicist and software engineer who translates first-principles research into lithography predictive models for production.

TECHNICAL SKILLS

Modeling

Data analysis, Data visualization, Statistical modeling, PDE solvers, Markov Chain Monte Carlo (MCMC), High-performance computing,

Programming

Python • Julia • JavaScript
C/C++ • HTML/CSS • \LaTeX
Unix commands • shell scripts

Tools/Packages

Numpy, Scipy, Pandas, Scikit-learn
Jupyter, PySpark
Git • SQL
Docker • Proxmox
Mathematica • MATLAB

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

PUBLICATIONS

4 first-authored papers
See more at kakkarav.com

LANGUAGES

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

EXPERIENCE

PRINCIPAL ENGINEER

Computational Lithography at TSMC, CA | Jun 2024 - Present

- Develop a physics-based stochastic failure model for EUV lithography.
- Implemented a rigorous 3D metal-oxide resist simulation application.
- Implemented a printability-detection algorithm for assist-feature optimization

GRADUATE STUDENT RESEARCHER

UC Berkeley, CA | Aug 2016 - Jun 2024

Modeling: Predicted and quantified a novel effective interaction between magnetic atoms on a thin-film superconductor.

- Developed a novel measurement technique using microwave spectroscopy.
- Collaborated with experimentalists to devise a realistic experimental scheme for constructing a quantum simulator using Josephson junctions.

Modeling: Reduced simulation time 3X using custom Monte Carlo update, enabling exploration of large-scale and discovery of new quantum phases.

- Developed an end-to-end Monte Carlo engine and data pipeline from scratch.
- Analyzed $\sim 1.3\text{M}$ clean data points of floats to classify phases of matter and discovered new quantum matters.

GRADUATE STUDENT INSTRUCTOR

UC Berkeley, CA | Aug 2016 - Jun 2023

- Taught 2 advanced *graduate* courses (Advanced AMO and Condensed Matter Physics) and 3 introductory *undergraduate* courses.
- 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.

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY | 2016 - 2024

Ph.D. in Physics, Theoretical AMO & Condensed Matter physics

Advisor: Professor Norman Yao

MASSACHUSETTS INSTITUTE OF TECHNOLOGY | 2012 - 2016

B.S. in Physics

GPA: 5.0/5.0

PUBLICATIONS

- [1] **Akkaravarawong, K.**, M. Bintz, J. D. Sau, L. I. Glazman, N. Y. Yao, and J. I. Väyrynen. Scalar chirality interaction mediated by yu-shiba-rusinov states. *Manuscript in preparation*, 2025.
- [2] **Akkaravarawong, K.**, S. Gazit, M. Dupont, C. Laumann, and N. Y. Yao. The compressible bosonic integer quantum hall in the presence of random chemical potential disorder. *Manuscript in preparation*, 2025.
- [3] **Akkaravarawong, K.**, J. I. Väyrynen, J. D. Sau, E. A. Demler, L. I. Glazman, and N. Y. Yao. Probing and dressing magnetic impurities in a superconductor. *Physical Review Research*, 1(3):033091, November 2019.
- [4] **Akkaravarawong, K.**, O. Shtanko, and L. Levitov. Ballistic guided electron states in graphene. *arXiv:1512.04185*, 2015.