

Andi Gu

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Education

Harvard University

Quantum Science and Engineering (PhD)

Cambridge, MA

August 2022 -

University of California, Berkeley

Bachelor of Arts in Computer Science and Physics; GPA: 4.0/4.0 (Highest Distinction)

Berkeley, CA

August 2018 - May 2022

Thesis: Practical Black Box Hamiltonian Learning

Publications

1. **A. Gu**, S. Oliviero, L. Leone. “Magic-induced computational separation in entanglement theory.” [ArXiv:2403.19610](https://arxiv.org/abs/2403.19610) [quant-ph], Mar. 2023.
2. **A. Gu**, S. Oliviero, L. Leone. “Doped stabilizer states in many-body physics and where to find them.” [ArXiv:2403.14912](https://arxiv.org/abs/2403.14912) [quant-ph], Mar. 2023.
3. H. Hu*, **A. Gu***, S. Majumder*, H. Ren, Y. Zhang, D. Wang, Y. You, Z. Mineev, S. Yelin, A. Seif. “Demonstration of Robust and Efficient Quantum Property Learning with Shallow Shadows.” [ArXiv:2402.17911](https://arxiv.org/abs/2402.17911) [quant-ph], Feb. 2023.
4. **A. Gu**, L. Cincio, P.J. Coles. “Practical Hamiltonian Learning with Unitary Dynamics and Gibbs States.” *Nature Communications*, vol. 15, no. 1, p. 312. [doi:10.1038/s41467-023-44008-1](https://doi.org/10.1038/s41467-023-44008-1), Jan. 2024.
5. **A. Gu**, L. Leone, S. Ghosh, J. Eisert, S. Yelin, Y. Quek. “Pseudomagic Quantum States.” [ArXiv:2308.16228](https://arxiv.org/abs/2308.16228) [quant-ph], Aug. 2023.
6. **A. Gu**, H. Hu, D. Luo, T. Patti, N. Rubin, S. Yelin. “Zero and Finite Temperature Quantum Simulations Powered by Quantum Magic.” [ArXiv:2308.11616](https://arxiv.org/abs/2308.11616) [quant-ph], Aug. 2023.
7. **A. Gu**, X. Huang, W. Sheu, G. Aldering, A. S. Bolton, K. Boone, A. Dey, A. Filipp, E. Jullo, S. Perlmutter, D. Rubin, E. F. Schlafly, D. J. Schlegel, Y. Shu, and S. H. Suyu. “GIGA-Lens: Fast Bayesian Inference for Strong Gravitational Lens Modeling.”, *The Astrophysical Journal*, vol. 935, no. 1, [doi:10.3847/1538-4357/ac6de4](https://doi.org/10.3847/1538-4357/ac6de4), Aug. 2022.
8. **A. Gu**, A. Lowe, P. Dub, P. Coles, and A. Arrasmith. “Adaptive Shot Allocation for Fast Convergence in Variational Quantum Algorithms.” [ArXiv:2108.10434](https://arxiv.org/abs/2108.10434) [quant-ph], Aug. 2021.
9. J. Calvey, T. Berenc, A. Brill, L. Emery, T. Fors, **A. Gu**, K. Harkay, T. Madden, N. Sereno, and U. Wienands. “Plan for Operating the APS-Upgrade Booster with a Frequency Sweep”, in Proc. IPAC’21, Campinas, SP, Brazil, May 2021, pp. 201-204. [doi:10.18429/JACoW-IPAC2021-MOPAB046](https://doi.org/10.18429/JACoW-IPAC2021-MOPAB046)
10. X. Huang, C. Storfer, **A. Gu**, et al. “Discovering New Strong Gravitational Lenses in the DESI Legacy Imaging Surveys.” *The Astrophysical Journal*, vol. 909, no. 1, Mar. 2021, p. 27. [doi:10.3847/1538-4357/abd62b](https://doi.org/10.3847/1538-4357/abd62b)

* denotes equal contributions.

Presentations and Posters

Invited Talk for the QAISIG QML Seminar

Practical Black Box Hamiltonian Learning

Singapore

April 2024

Invited Talk for the Qiskit Seminar

Entanglement meets Magic

Cambridge, MA

March 2024

Presented Poster for QIP 2024

Pseudomagic Quantum States

Taipei, TW

January 2024

Invited Talk at Phasecraft

Practical Black Box Hamiltonian Learning

London, UK

January 2023

Invited Talk at the QED-C Poster Sessions

Adaptive Shot Allocation for Fast Convergence in Variational Quantum Algorithms

Arlington, VA

June 2022

Invited Talk at the KIPAC Cosmology Seminar <i>GIGA-Lens: A Fast Differentiable Bayesian Lens Modeling Framework</i>	Stanford, CA April 2022
Invited Talks at the LBNL NERSC Machine Learning and Data Seminar <i>GIGA-Lens: A Fast Differentiable Bayesian Lens Modeling Framework</i>	Berkeley, CA April 2022
Presented Poster for the UC Berkeley Undergraduate Physics Poster Session <i>Hamiltonian Learning with Unitary Dynamics</i>	Berkeley, CA March 2022
Invited Talk at the Supernova Cosmology Project Undergraduate Research Forum <i>Modeling Strong Gravitational Lenses Discovered in DESI Legacy Imaging Surveys with the HST</i>	Berkeley, CA September 2021
Presentation for the Information Science & Technology Institute Summer School Symposium <i>Learning Properties of Physical Systems from Quantum Circuit Data</i>	Los Alamos, NM August 2021
Presented Poster for the UC Berkeley Undergraduate Physics Poster Session <i>Restricted Boltzmann Machines for Quantum State Tomography</i>	Berkeley, CA May 2021
Presentation for the 2020 Lee Teng Symposium <i>Tracking Studies with Frequency Ramp for the APS-U Booster</i>	Chicago, IL August 2020

Work Experience

Phasecraft <i>Quantum Software Intern</i> Designing efficient and noise-resilient methods for materials models simulation	Bristol, UK May 2022 - August 2022
UC Berkeley Physics 111A Instrumentation Lab Undergraduate Teaching Assistant <i>Supervised by course instructors Dr. Amin Jazaeri and Dr. Mathias Reinsch</i>	Berkeley, CA May 2021 - August 2021
Gridware <i>Research Intern</i>	San Francisco, CA December 2019 - February 2020
Salesforce <i>Software Engineer Intern</i>	San Francisco, CA May - August 2019

Outreach

Presentation for the ‘Physics in and Through Cosmology’ Workshop <i>What Can Gravitational Lenses Teach Us About Nature?</i> Presented to high school students and teachers as part of a Lawrence Berkeley National Laboratory workshop series to introduce students to cosmology research.	Berkeley, CA June 2022
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Awards & Honors

- Recipient of the Unitary Fund Grant (Spring 2023)
- Harvard Quantum Initiative Generation Q Graduate Fellowship (Fall 2023)
- NERSC High Performance Computing Achievement Awards (Fall 2022)
- UC Berkeley Physics Department Citation, awarded to the top graduating senior in the physics department (Spring 2022)
- Phi Beta Kappa Member
- H2H8 Research Grant (Spring 2021 – Spring 2022)
- Electrical Engineering & Computer Science Departmental Award (Fall 2021)
- Berkeley Physics Undergraduate Research Scholar (Spring 2021, Fall 2021)
- Western Union Foundation Global Scholarship (Fall 2019 – Spring 2020)
- Grand prize winner (from over 100 participants) at Jane Street’s San Francisco ETC (Summer 2019)
- Overall third place winner (from over 700 participants) at CalHacks 2018, as well as the winner of best Google hack. Collaborated with Google on a [case study](#) for Google Cloud Platform.
- Edward Frank Kraft Award (Fall 2018)
- Broadridge Scholarship (Fall 2018 – Spring 2022)

Technical Skills

- Machine learning and probabilistic programming: TensorFlow, JAX, TensorFlow Probability, and NumPyro
- Computational quantum physics: Qiskit, QuTiP, PennyLane, Cirq, TensorFlow Quantum
- General purpose scientific computing: NumPy, SciPy, scikit-learn, Matplotlib, Open MPI
- Web development: React.js, React Native, Node.js, Flask, Django