Newton Cheng

newtoncscheng@gmail.com
(316) 925-1935
San Francisco, CA

LinkedIn: tinyurl.com/uc7ejk
Google Scholar: tinyurl.com/3phdrcpm

Summary

PhD student with research experience in theoretical physics and quantum information with 4 publications. Graduate coursework and projects in data science and machine learning. Highly motivated and excited to engage with challenging real-world problems in ML, AI, NLP via a combination of theory and empirical experiment.

Education

- **PhD Student in Physics**, *UC Berkeley*, GPA: 3.95 *2018 - present (grad. 2023)*

- **B.S. in Physics (Honors with Distinction)**, *Stanford University*, GPA: 4.03 *2014-2018*

Experience

- **PhD Researcher**, *UC Berkeley* *2018 - present*
  - Advised by Raphael Bousso; conducting research into quantum information, quantum gravity, quantum error correction, and quantum computing
  - Planned and executed novel research projects ranging from 2 months to 1 year, yielding 4 publications with 3 forthcoming, both independently and in collaboration with 1 to 4 colleagues
  - Project examples include fundamental structure of entanglement, and generalizing quantum gravity methods to general quantum mechanics
  - Engaged in short and long-term project planning, goal setting, team management, and organizing and leading meetings with collaborators to successfully bring projects from conception to completion
  - 12 talks and presentations to academic and non-academic audiences from 2019 to present
- **Graduate Coursework**, *UC Berkeley* *2018 - present*
  - Graduate statistics and statistical learning theory, with topics including estimation, hypothesis testing, optimization, generalization, Bayesian methods etc.
  - Project-based machine learning, data analytics, and natural language processing courses
  - Experience with analysis, probability, random matrix theory, information theory, and related topics from mathematics
- **Head Graduate Student Instructor**, *UC Berkeley* *2018 - present*
  - Managed teams of 8-12 Graduate Student Instructors in executing novel teaching materials to courses of over 400 students
  - Assisted in the transition to remote teaching, and the development of virtual resources now used across UC Berkeley Physics Department courses, reaching over 3000 students per semester
  - Assistant instructor for 4 undergraduate courses; developed and executed original materials utilizing research-driven teaching methods, resulting in $\sim$8% improvement in student performance

Other Skills

- Mathematica, Python (NumPy, pandas, scikit-learn, statsmodels, JupyterLab; PyTorch)
- Extensive experience in technical writing and speaking for academic and public audiences

Publications and Preprints

[1] N. Bao and N. Cheng, "Eigenstate Thermalization Hypothesis and Approx. Quantum Error Correction," *JHEP* **08** (2019) 152.
[2] N. Bao and N. Cheng, "Multipartite Reflected Entropy," *JHEP* **10** (2019) 102.
[3] N. Cheng, "Optimized Correlation Measures in Holography," *Phys. Rev. D* **101** (2020) 066009.
[4] N. Bao, N. Cheng, S. Hernández-Cuenca, V. Su, "The Quantum Entropy Cone of Hypergraphs," *SciPost Phys.* **9** (2020) 067.
[5] N. Bao, N. Cheng, S. Hernández-Cuenca, V. Su, "A Gap Between the Hypergraph and Stabilizer Entropy Cones," *arXiv preprint* (2020).
[6] N. Bao, N. Cheng, S. Hernández-Cuenca, V. Su, "Topological Link Models of Multipartite Entanglement," *arXiv preprint* (2021).