

# Chung-En Tsai

R407, Der-Tien Hall  
National Taiwan University  
Taipei, Taiwan (R.O.C.)

Personal website  
chungentsai@ntu.edu.tw  
Dec 19th, 2023

## Education

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### National Taiwan University (NTU)

Sep 2019 – Jun 2023

*B.S. in Computer Science and Information Engineering (CSIE)*

*Taipei, Taiwan*

- GPA: 4.23/4.30 (Rank 5/123); Major GPA: 4.29/4.30.
- Two Dean's list awards in 2020 and 2022, respectively.

## Research Experience

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### Research Assistant

Sep 2021 – Present

*Department of Computer Science and Information Engineering, NTU*

*Taipei, Taiwan*

- Advised by Prof. Yen-Huan Li. Collaborate with Prof. Hao-Chung Cheng.
- Establish the first data-dependent bounds for online portfolio selection.
- Propose a unified framework for online convex optimization with relatively smooth, self-concordant barriers loss functions.
- Design first-order optimization algorithms for computing maximum-likelihood estimates for the Poisson inverse problem and quantum state tomography.
- Present posters at NeurIPS 2023 (poster) and the upcoming QIP 2024.
- Give one oral presentation at ALT 2023 (talk).
- Give three talks at the Trends in AI Theory Seminar Series jointly held by MediaTek Research and three labs in NTU.
- Win the second and third places and the Appier Best Research Award at NTU CSIE Undergraduate Research Competition (poster2022, poster2023).

### Undergraduate Research Program

Sep 2022 – Jun 2023

*Mathematics Division, National Center for Theoretical Sciences*

*Taipei, Taiwan*

- Advised by Prof. Chun-Hsiung Hsia.
- Provide sufficient initial conditions for the synchronization of the Kuramoto model with the ReLU-Sin coupling.
- Win the undergraduate research award from the Mathematics Society of the Republic of China.

### Summer Research Intern

Jul 2022 – Aug 2022

*Institute of Information Science, Academia Sinica*

*Taipei, Taiwan*

- Advised by Prof. Kai-Min Chung.
- Study Boolean and arithmetic circuit lower bounds and communication complexity.

## Professional Experience

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<b>Teaching Assistant</b> CSIE5062: Online Convex Optimization, NTU	Sep 2023 – Dec 2023
<b>Volunteer</b> 2023 IEEE International Symposium on Information Theory (ISIT)	Jun 2023
<b>Teaching Assistant</b> CSIE5002: Prediction, Learning, and Games, NTU	Feb 2023 – Jun 2023
<b>Member and Minister of the Academic Department</b> The 43rd and 44th NTU CSIE Student Council	Aug 2020 – Jul 2022
<b>Member and Leader of “Challenge”</b> NTU CSIE Summer Camp	May – Aug, 2020 & 2021
<ul style="list-style-type: none"><li>Develop AI games for high school students to learn Python (Challenge 2020, Challenge 2021)</li></ul>	

## Publications

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### Published conference papers

1. Chung-En Tsai, Hao-Chung Cheng, and Yen-Huan Li. Online self-concordant and relatively smooth minimization, with applications to online portfolio selection and learning quantum states. In *Proc. 34th Int. Conf. Algorithmic Learning Theory (ALT)*, pages 1481–1483, 2023

### Posters

3. Chung-En Tsai, Hao-Chung Cheng, and Yen-Huan Li. Improved dimension and sample size scalability for maximum-likelihood state tomography and approximating PSD permanents. In *Int. Conf. Quantum Information Processing (QIP)*, 2024
2. Chung-En Tsai, Ying-Ting Lin, and Yen-Huan Li. Data-dependent bounds for online portfolio selection without Lipschitzness and smoothness. In *Conf. Neural Information Processing Systems (NeurIPS)*, 2023. arXiv:2305.13946
1. Chung-En Tsai, Hao-Chung Cheng, and Yen-Huan Li. Faster stochastic first-order method for maximum-likelihood quantum state tomography. In *Int. Conf. Quantum Information Processing (QIP)*, 2023. arXiv:2211.12880

### Working papers

2. Chung-En Tsai, Hao-Chung Cheng, and Yen-Huan Li. Fast minimization of expected logarithmic loss via stochastic dual averaging. *arXiv preprint*, 2023. arXiv:2311.02557
1. Chung-En Tsai and Chun-Hsiung Hsia. Synchronization of Kuramoto model beyond sinusoidal interactions. Manuscript, 2023