BO-YU CHEN

b12202023@ntu.edu.tw https://phys-mattchen.github.io/

EDUCATION & POSITIONS

National Taiwan University (NTU) — Taipei, Taiwan
B.S. in *Physics* & *Computer Science* | GPA: 4.22/4.30 (Overall/Scale) — Sep 2023 - present

- NTU Fu Bell Scholarship (Highest distinction, Top 1 % across NTU, Total amount NTD $800,000$ ($\approx$ USD $25,000$)
- 1st place in the undergraduate special talent admission
- Computer Science for double major, acceptance rate $< 10\%$

University of Illinois at Urbana-Champaign (UIUC) — Urbana, IL, USA
Exchange Student in College of Liberal Arts & Sciences — Sep 2025 - Jun 2026

Österreichische Akademie der Wissenschaften (ÖAW) — Innsbruck, Tyrol, Austria
Research Intern in Institut für Quantenoptik und Quanteninformation (IQOQI) — Commencing 2025 winter

- ***Advisor***: Prof. Hannes Bernien (bernien@uchicago.edu)

University of Chicago (UChicago) — Chicago, IL, USA
Research Intern in Department of Physics and Pritzker School of Molecular Engineering — Jun 2024 - Sep 2024

- UChicago-Taiwan Student Exchange (UCTS) Fellowship (Youngest awardee, UChicago featured news interview)
- ***Project***: An atom rearrangement simulator for dual-species tweezer arrays
- ***Advisor***: Prof. Hannes Bernien
- ***Side Project***: design and build up 2025 UCTS program official website
- ***Advisor***: Prof. Cheng Chin (cchin@uchicago.edu)

Affiliated Senior High School of National Taiwan Normal University — Taipei, Taiwan
Computer Science Honor Program | GPA: 100/98/100 (Math/Physics/Scale) — Aug 2020 - Jun 2023

- Taipei City Mayor Award (Highest distinction, Top 1% graduates)

RESEARCH INTERESTS

Quantum infomration processing, quantum optics, statistical machine learning.

REFEREED PUBLICATIONS

*Equal contribution. **Citations Summary**: h-index = 4, Total citations = 97 (Google Scholar)

[6] Nonparametric Modern Hopfield Models,
Jerry Yao-Chieh Hu*, **Bo-Yu Chen***, Dennis Wu, Feng Ruan, Han Liu,
arXiv:2404.03900, under review (2024)

[5] STanHop: Sparse Tandem Hopfield Model for Memory-Enhanced Time Series Prediction,
Dennis Wu*, Jerry Yao-Chieh Hu*, Weijian Li*, **Bo-Yu Chen**, Han Liu,
In *12th International Conference on Learning Representations (ICLR'24)*, 2024. arXiv:2312.17346

[4] Magnetoresistance Properties in Nickel-catalyzed, Air-stable, Uniform, and Transfer-free Graphene,
Bo-Yu Chen, Bo-Wei Chen, Wu-Yih Uen, Chi Chen, Chiashain Chuang, Dung-Sheng Tsai,
Nanotechnology **35**, 205706, 2024. DOI: 10.1088/1361-6528/ad2381

[3] On Sparse Modern Hopfield Model,
Jerry Yao-Chieh Hu, Donglin Yang, Dennis Wu, Chenwei Xu, **Bo-Yu Chen**, Han Liu,
In *37th Conference on Neural Information Processing Systems (NeurIPS'23)*, 2023. arXiv:2309.12673
This work was highlighted in *Northwestern CS department news*.

[2] Modulations for Quantum Electronic Material Transports by Vacuum Annealing Methods,
Ji-Wei Ci, **Bo-Yu Chen**, Yuan-Chih Hung, Huan-Chien Wang, Dung-Sheng Tsai, Wu-Yih Uen, Yuan-Liang Zhong, Jhy-Shyang Wang, Chi-Te Liang, Chiashain Chuang,
Spin **13**, 2340023, 2023. DOI: 10.1142/S2010324723400234

[1] First-Principles Study on Possible Half-Metallic Ferrimagnetism in Double Perovskites $Pb_2XX'O_6$ (X = Ti, Zr, Hf, V, Nb and Ta, X' = Tc, Ru, Os and Rh),
Bo-Yu Chen, Po-Han Lee, Yin-Kuo Wang,
Materials **15**, 3311, 2022. DOI: 10.3390/ma15093311

AWARDS & SCHOLARSHIPS

- **Bernien lab undergraduate research stipends**, IQOQI, ÖAW, Austria 2025
- **CoS Travel Grants and Scholarship**, College of Science, NTU, Taiwan 2024
- **UChicago-Taiwan Student Exchange (UCTS) Fellowship**, Department of Physics, UChicago, USA 2024
- **Presidential Award** (Awarded to students ranking in the top 5%), NTU, Taiwan 2024 spring
- **Fu Bell Scholarship** (Highest distinction, Top 1% across university), NTU, Taiwan 2023, 2024
- **Taipei City Mayor Award** (Top 1% high school graduates), Taipei City, Taiwan 2023
- **Sakura Science Exchange Program** (official invitation), Japan Science and Technology Agency, Japan 2023

RESEARCH EXPERIENCE

Department of Computer Science, Northwestern University Evanston, IL, USA (Remote)
Computational and Statistical Theory of Hopfield models Jan 2023 - Jan 2024

- Remote research intern, with Prof. Han Liu
- Established nonparametric framework for transformer-corresponded associative memory [6]
- Investigated StanHop, a fast test-time model for Time Series application in finance/science [5]
- Completed a unified theoretical framework for the Transformer-Modern Hopfield Models correspondence [3]

Department of Electronics Engineering, Chung Yuan Christian University Taoyuan, Taiwan
Two-Dimensional Materials and Nanoscale Electronic Devices Aug 2021 - Jun 2023

- Independent research, with Prof. Chiashain Chuang and Prof. Dung-Sheng Tsai
- Investigated magnetoresistance mechanism in transfer-free graphene and its potential applications in nanoscale magentic sensor. [4]
- Investigated the quantum transports phenomenon in electronic materials by vacuum annealing method. [2]

National Taiwan Normal University Taipei, Taiwan
Density Functional Theory and First Principle Calculation Oct 2021 - May 2022

- Independent research, with Dr. Po-Han Lee and Prof. Yin-Kuo Wang
- Explored half-metallic and magnetic properties of Pb-based double perovskite for spintronics applications [1]

SELECTED CONFERENCES PRESENTATIONS

[4] Dual-Species Neutral Atom Array 2.0: Towards a Versatile and Scalable Quanutm Processor,
Bob Bao, Nikhil Harle, **Bo-Yu Chen**, Jinyue Jiang, Hannes Bernien,
Quantum Science Gordon Research Conference, MA, USA, July 2024

[3] Temperature-Dependent Magnetoresistance of Transfer-Free Graphene Grown by APCVD,
Bo-Yu Chen, Bo-Wei Chen, Ji-Wei Ci, Wu-Yih Uen, Po-Han Lee, Chi Chen, Chiashain Chuang, Dung-Sheng Tsai,
13th Recent Progress in Graphene and 2D Materials Research Conference, Taipei, Taiwan, November 2022

[2] Ab initio study on the growth mechanism of graphene on metal,
Bo-Yu Chen, Po-Han Lee, Yin-Kuo Wang,
2022 Annual Meeting of the Physical Society of Taiwan, Taipei, Taiwan, January 2022

[1] Layer-dependent properties of $SnSe_2$ two dimensional materials,
Bo-Yu Chen, Po-Han Lee, Yin-Kuo Wang,
2022 Annual Meeting of the Physical Society of Taiwan, Taipei, Taiwan, January 2022

PROFESSIONAL SERVICE & OUTREACH

- Reviewer for top-tier machine learning conference: *AISTATS 2025, NeurIPS 2024, AISTATS 2024*
- Team leader, 2024 UCTS exchange program, Physical Science Division, UChicago 2024
- Public talks about UCTS program: NTU freshman forum (> 150 audiances), NTU English corner (poster) 2024
- Assistant, SMART (Science, Mathematics, and Research Training) program, Chin lab, UChicago 2024
  - Introduced science for 20 unrepresentative students from public high schools on Chicago's South Side.

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