BO-YU CHEN

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EDUCATION

National Taiwan University Taipei, Taiwan
Bachelor of Science in Physics | GPA: 4.15/4.30 (Overall/Scale) Sep 2023 - present

- National Taiwan University Fu Bell Scholarship (Highest distinction, Top 1 % across university, $ 6500 per year)
- 1st place in the undergraduate special talent admission

University of Chicago, Pritzker School of Molecular Engineering Chicago, IL
Visiting Student | Research Intern Jun 2024 - Sep 2024 (expected)

- Full scholarship from UChicago-Taiwan Student Exchange Fellowship (Youngest Awardee)
- Advisor: Hannes Bernien

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)
- 1st place in the entrance exam

RESEARCH INTERESTS

Statistical machine learning, 2D materials.

PUBLICATIONS

⋆Equal contribution. **Citations Summary**: h-index=2, Total citations=12 (Google Scholar)

[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, 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

- **UChicago-Taiwan Student Exchange Fellowship**, Physical Science Division, UChicago, USA 2024
- **Fu Bell Scholarship** (Highest distinction, Top 1% students across university, $ 6500 per year), NTU, Taiwan 2023
- **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 EXPERIENCES

Pritzker School of Molecular Engineering, University of Chicago — Chicago, IL (Remote)
Dual-Species Atom Arrays Quantum Architecture — Feb 2024 - present
- Undergaduate research, with Prof. Hannes Bernien — plan to visit in 2024 summer
- Supported by UChicago-Taiwan Student Exchange (UCTS) Fellowship.
- Implement the atom rearrangement protocols by using a combination of acousto-optic deflectors and spatial light modulators.

Department of Computer Science, Northwestern University — Evanston, IL (Remote)
Computational and Statistical Theory of Ising Model in Machine Learning — Jan 2023 - present
- Undergraduate research, with Prof. Han Liu
- Introduced STanHop-Net, a time series prediction model, combines a Hopfield-based block with external memory modules, enhancing learning, rapid response to rare events, and superior empirical performance. [5]
- Introduced a sparse modern Hopfield model with memory-retrieval dynamics connecting to the sparse-structured attention, enabling robust representation learning, fast convergence, and exponential memory capacity. [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
- Synthesized transfer-free graphene by atmospheric-pressure chemical vapour deposition (APCVD) and investigated its magnetoresistance mechanism for potential applications in nanoscale magentic sensor. [4]
- Investigated the quantum electronic material transports by vacuum annealing methods. [2]

National Taiwan Normal University — Taipei, Taiwan
Density Functional Theory and First Principle Calculation — Oct 2021 - May 2022
- Independent research, with Prof. Po-Han Lee and Prof. Yin-Kuo Wang
- Investigated the half-metallic and ferrimagnetic properties of Pb-based double perovskite by Vienna Ab initio Simulation Package (VASP). [1]

CONFERENCES PRESENTATIONS

[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 Two-dimensional 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