

BO-YU CHEN

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EDUCATION

National Taiwan University

Taipei, Taiwan

Bachelor of Science in Physics

Sep 2023 - present

- Fu Bell Scholarship (awarded to top 1 % students across university)
- 1st place in the undergraduate admission

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 (awarded to top 1% graduates)
- 1st place in the entrance exam

RESEARCH INTERESTS

Statistical Machine Learning; Two-dimensional Materials

PUBLICATIONS

*Equal contribution.

- [6] Nonparametric Modern Hopfield Models,
Jerry Yao-Chieh Hu*, **Bo-Yu Chen***, Dennis Wu, Siao-Fong Li, Feng Ruan, Han Liu,
Under review.
- [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,
Under review.
- [4] Air-Stable, Defectless and Magnetoresistance Properties in Nickel-Catalyzed Transfer-Free Graphene,
Bo-Yu Chen, Bo-Wei Chen, Wu-Yih Uen, Chi Chen, Chiashain Chuang, Dung-Sheng Tsai,
Accepted to **Nanotechnology**, 2023.
- [3] On Sparse Modern Hopfield Model,
Jerry Yao-Chieh Hu, Donglin Yang, Dennis Wu, Chenwei Xu, **Bo-Yu Chen**, Han Liu,
Advances in Neural Information Processing Systems (**NeurIPS'23**), 2023. [arXiv:2309.12673](https://arxiv.org/abs/2309.12673)
- [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,
Accepted to **Spin**, 2023, DOI: [10.1142/S2010324723400234](https://doi.org/10.1142/S2010324723400234)
- [1] First-Principles Study on Possible Half-Metallic Ferrimagnetism in Double Perovskites $\text{Pb}_2\text{XX}'\text{O}_6$ ($\text{X} = \text{Ti, Zr, Hf, V, Nb}$ and Ta , $\text{X}' = \text{Tc, Ru, Os}$ and Rh),
Bo-Yu Chen, Po-Han Lee, Yin-Kuo Wang,
Materials, 2022, DOI: [10.3390/ma15093311](https://doi.org/10.3390/ma15093311)

HONORS

- **Fu Bell Scholarship** (awarded to top 1% students across university), NTU, Taiwan 2023
- **Taipei City Mayor Award** (awarded to top 1% high school graduates), Taipei, Taiwan 2023
- **Sakura Science Exchange Program** (invited by Japan Science and Technology Agency), Japan 2023

RESEARCH EXPERIENCES

Northwestern University

Evanston, IL (Remote)

Computational and Statistical Theory of Ising Model in Machine Learning

Jan 2023 - present

- Undergraduate research, with **Prof. Han Liu** at NU Department of Computer Science/Statistics
- Investigated a nonparametric framework for modern Hopfield model, and showcased the versatility of this framework by constructing a family of efficient modern Hopfield models as extensions. [6]
- 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]

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** at CYCU Department of Electronics Engineering
- Synthesized transfer-free graphene by atmospheric-pressure chemical vapour deposition (APCVD) and investigated its magnetoresistance mechanism for potential applications in nanoscale magnetic 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** at NTNU
- Investigated the half-metallic and ferromagnetic 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 SnSe₂ 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