Bowen Yu

Email: bowenyu@mit.edu
Website: https://bowenyu066.github.io/
Telephone: +1 (617) 685-9188; +86 181 7148 1376

Education

Massachusetts Institute of Technology (*Cambridge, MA, United States*) *Aug. 2024 – Present*

Selected Coursework: Machine Learning, Introduction to Deep Learning, Fundamentals of Programming, Design and Analysis of Algorithms, Low-level Programming in C and Assembly, Computational Architecture, Linear Algebra and Optimization, Quantum Physics I, II & III, Physics of Solids, Statistical Mechanics II, Quantum Field Theory I

Peking University (*Beijing, China*) *Sep. 2023 – Jul. 2024*

Selected Coursework: Introduction to Computation, Data Structure and Algorithms, Classical Mechanics, Quantum Mechanics, Thermodynamics and Statistical Mechanics, Quantum Statistical Physics, Lie Groups and Lie Algebras

No.1 Middle School Affiliated to Central China Normal Univ. (*Wuhan, China*) *Sep. 2020 – Jul. 2023*

Awards & Honors

International Physics Olympiad (IPhO) Gold Medalist *Jul. 2023*

- Represented China at the 53rd International Physics Olympiad (one of 5 team members)
- Ranked 1st place in the world and awarded a Gold Medal

Chinese Physics Olympiad (CPhO) Gold Medalist *Dec. 2021 & Oct. 2022*

- Awarded the Gold Medal in the finals of the 39th Chinese Physics Olympiad, and selected for the national team
- Awarded the Gold Medal in the finals of the 38th Chinese Physics Olympiad

Working Experiences

AI & Material Science Research Assistant @ MIT *Jan. 2025 — Present*

- Quantum Measurement Group, Massachusetts Institute of Technology
- Extensively applied various machine learning force field (MLFF) models, especially MACE, to predict relevant physical properties of materials (phonon, heat conductivity, etc.) while preserving computation accuracy
- Trained a foundational model for non-destructive defect identification from vibrational spectra, specifically phonon density-of-states (PDoS)
- Supervisor: Professor Mingda Li

AI Workload Deployment Intern @ Intel *Jun. 2025 — Jul. 2025*

- Conducted in-depth research on low-level GPU memory layouts, including CuTe layout (NVIDIA CUTLASS) and linear layout (OpenAI Triton)
- Explored NVIDIA's recently released CuTeDSL framework in depth, analyzing its lowering process to the backend using operations in the CUTLASS library as a case study
- Supervisor: Fangwen Fu, Xiaodong Qiu, Ivan Luo

Publications

† → Equal contribution; * → Corresponding author

J1. Cheng[†,*], M., Fu[†], C.-L., **Yu[†], Bowen**, Rha, E., Chotrattanapituk, A., Abernathy, D. L., Cheng, Y. & Li[*], M. A Foundation Model for Non-Destructive Defect Identification from Vibrational Spectra. *In Review* (2025).
– Paper available at: arXiv:2506.00725.

J2. Cheng[†,*], M., Luo[†], W., Tang[†], H., **Yu, Bowen**, Cheng, Y., Xie, W., Li, J., Kulik, H. J. & Li[*], M. Enhancing Materials Discovery with Valence Constrained Design in Generative Modeling. *In Review* (2025).
– Paper available at: arXiv:2507.19799.

Projects

MIT Statistical Physics II Course Project *Jan. 2025*

- Simulate the non-equilibrium relaxation and the phase transition of the 2D Ising model, using both discrete- and continuous-time simulation methods
- Code available at: https://github.com/bowenyu066/ising-kmc

Skills

- **Languages:** English (*fluent*), Chinese (*native*), Cantonese (*basic*), Spanish (*basic*)
- **Programming Languages:** C/C++, Python, Bluespec, RISC-V Assembly, LaTeX
- **Libraries**: PyTorch, NumPy, Matplotlib, ASE, PyMatgen, Matformer, MACE, Triton, CUTLASS
- **Technologies**: Linux, Git, GitHub, Docker, SSH, VSCode, Jupyter Notebook

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Last updated: August 4, 2025