Chon-Hei Lo

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EDUCATION

Peking University

Beijing, China

Bachelor of Science, School of Physics — Sep 2020 – Jul 2024

General GPA: 87.3 / 100

Research Skills: Machine Learning, Molecular Dynamics.

Computer Skills: Python (PyTorch), C++, Mathematica, LAMMPS.

WORK EXPERIENCE

International Center of Quantum Materials, Peking University

Beijing, China

Research Assistant, Advisor: Prof. Limei Xu — Jul 2024 – Present

PUBLICATION

Binze Tang*****, **Chon-Hei Lo***, Mian Qin*****, Tiancheng Liang*****, Jiani Hong*****, Yizhi Song, Ye Tian, Ying Jiang[*], Duanyun Cao[†], and Limei Xu[†]. "Machine learning resolves 3D atomic structure of ice surface from AFM images". (In preparation)

Binze Tang*****, Lingyu Zuo*****, **Chon-Hei Lo**, Jun Cheng, Zhi Qi[†], and Limei Xu[†]. "Phase separation of transcription proteins on heterogeneous DNA motif". (In preparation)

RESEARCH EXPERIENCE

Undergraduate Research on Interfacial Water Systems

International Center of Quantum Materials, Peking University — Aug 2022 – Present

Advisor: Prof. Limei Xu

Resolving the structures of interfacial water and hydrated ions from experimental AFM images using MD, DFT, and ML — Aug 2022 – Jun 2024

- Simulated interfacial water system using TIP4P model in LAMMPS and the simulation AFM images using **PPAFM** package.
- Applied 3D object detection and domain adaptation techniques to determine the spatial information of atoms in the experimental AFM images.
- Constructed efficient algorithms for fixing hydrogen bonds networks, physically meaningful loss function, crystal matching and fitting.
- Used Variational Autoencoder to match disordered interfacial structure with bulk crystal without periodic conditions, lattice constants, or crystal orientations and shifts.

Crystallization mechanism of 2D amorphous ice Feb 2024 – Jun 2024

- Discovered possible crystallization processes of 2D amorphous ice using machine learning.

Theoretical and experimental research on liquid-liquid phase separation of proteins Jun 2024 – Jul 2024

- Developed efficient swap Monte Carlo simulation environments using Python with JIT for NVT and μVT ensembles.

Anomalous mechanical behavior for hyperuniform disordered systems Jun 2024 – Present

- Developed a simulation environment using parallel Swap-MC and Molecular Dynamics methods on simulating hyperuniform glass.

Summer Research Internship on Physics Informed Neural Network

School of Engineering and Applied Science, University of Pennsylvania Jun 2023 – Nov 2023

Advisor: Prof. Lu Lu

- Carried out an algorithm using physical a priori knowledge to accelerate the convergence of NNs.
- Conducted a systematic investigation into the foundational theories of active machine learning.

Collaboration on applying Machine Learning into thunderstorm Events study

Department of Atmospheric and Oceanic Sciences, Peking University Sep 2023 – Jul 2024

Collaborator: Dr. Chan-Pang Ng

- Developed a neural network framework using Graph Neural Networks and Long Short-Term Memory to predict future thunderstorm events.

AWARDS & SCHOLARSHIPS

International Distributed Physics Olympiad 2020, Bronze Metal	2020
Academic Excellence Scholarship, Peking University	2020 - 2024
Special Scholarship, Macao foundation	2020 - 2024

TALKS AND PRESENTATIONS

- “Machine Learning-Aided 3D Structure identification of the Bulk Ice Interface”, IMPRS-CPQM selection workshop, Feb 2024.

ADDITIONAL ACTIVITIES

- Served as the consultant of Macau Cultural Communication Association in Peking University, 2022 – 2024.
- Served as the research intern in Macau SAR Economic and Technological Department SAR Economic and Technological Department, 2021.
- Having the certification of Piano Grade 8 in London College of Music.