

# Sze Wai Pang

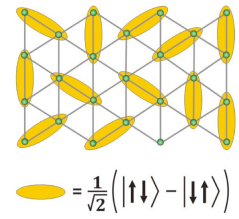
✉ waipangsize@gmail.com

🐙 github.com/waipangsize

orcid 0000-0002-4239-7566

📍 Hong Kong

📧 waipangsize.github.io



## Interests

- 📖 Physics, Mathematics, Numerical Weather Prediction (NWP), Data assimilation, Machine learning, Deep learning, Computational Fluid Dynamics (CFD)

## Education

- 2013 – 2020 📖 **PhD in Physics**  
**The Hong Kong University of Science and Technology (HKUST)**  
Theoretical and Computational Condensed Matter Physics
- 2010 – 2013 📖 **Bachelor of Science in Physics**  
**The Hong Kong University of Science and Technology (HKUST)**  
Major: Physics and Mathematics

## Employment

- 1/2024 – Now 📖 **Principal Scientist.** ClusterTech Limited
  - Lead research teams, providing direction and guidance on project objectives and methodologies
  - To design, implement, and oversee experiments aimed at product research and development
  - Project management
- 7/2020 – 12/2023 📖 **Senior Computational Scientist.** ClusterTech Limited
  - Carry out the study of Numerical Weather Prediction (NWP) and Climate Change
  - Analyse simulation results
  - Collaborate with the academic sector and conduct research and development (R&D) for weather-related products/projects
  - Support routine operations of forecasting systems as well as the underlying HPC/IT infrastructures

## Research Publications

### Journal Articles

- 1 W.-P. Sze, S.-C. Tang, C.-C. Cheung, and C.-Y. Tam, “Numerical weather prediction at 200 m local resolution based on an unstructured grid global model,” *Earth and Space Science*, vol. 9, no. 10, e2022EA002342, 2022.
- 2 W. P. Sze, T. K. Ng, and K. T. Law, “Emerging ergodic behavior within many-body localized states,” *arXiv preprint arXiv:2005.11812*, 2020.

### Conference Proceedings

- 1 Chi-Chiu Cheung, Ka-Ki Ng, Wai-Pang Sze and Jimmy Tat Chi Wong, “MPAS-A with Hierarchical Timestepping and Customized Mesh Generation: 2023 Updates,” Joint WRF/MPAS Users’ Workshop 2023, 20 – 23 June, 2023, 2023. 🔗 URL:  
[https://www2.mmm.ucar.edu/wrf/users/workshops/WS2023/presentations/day3/1\\_cheung.pdf](https://www2.mmm.ucar.edu/wrf/users/workshops/WS2023/presentations/day3/1_cheung.pdf).

- 2 C.-C. Cheung, C.-Y. Tam, W.-N. Leung, K.-K. Ng, and W.-P. Sze, “Applications of flexible spatial and temporal discretization techniques to a numerical weather prediction model,” in *Proceedings of the Platform for Advanced Scientific Computing Conference*, ser. PASC '22, Basel, Switzerland: Association for Computing Machinery, 2022, ISBN: 9781450394109. [DOI](#): 10.1145/3539781.3539790.

## Skills

Languages	English, Mandarin Chinese, Cantonese
Coding	Python, FORTRAN, Shell Script, C++, Matlab, NCL, $\text{\LaTeX}$
Software	WRF, MPAS, JEDI-MPAS(DA), ecFlow, PALM, OpenFOAM, Conda/Micromamba, Spack, Singularity, SLURM.
Misc.	Academic research, Teaching, Training, Consultation

## Miscellaneous Experience







### Works

Technical	<ul style="list-style-type: none"><li>Performed sensitivity analyses on atmospheric models (WRF/MPAS/CPAS), optimizing physics schemes and applying results to real-world business projects</li><li>Carried out model tuning, including mesh design and adjustments to PBL (YSU and scale-aware Shin-Hong), GWDO (YSU and scale-aware GSL), cloud fraction, and surface drag parameterization through namelist options (topo_wind)</li><li>Integrated WRF-UCM (Urban Canopy Model) into the MPAS/CPAS framework and applied it to various projects</li><li>Integrated MPAS/CPAS with OpenFOAM to provide meteorological inputs for CFD simulations</li><li>Managed and maintained operational meteorological simulations using the CPAS model via ecFlow</li><li>Developed and optimized JEDI-MPAS for enhanced performance</li><li>Applied machine learning for data analysis and post-processing, including bias correction</li></ul>
Business	<ul style="list-style-type: none"><li>Participated in multiple Exhibitions including 2022 LOGTECH, 2023 International Maritime Conference and Exhibition (Marintec), 2023 InnoEX, 2024 Singapore Asia Climate Forum, and 2024 Nanjing SmartHK Jiangsu-Hong Kong High-Quality Development Cooperation Conference</li><li>Client visits</li><li>Prepared and submitted tenders, including technical proposals and cost estimations, and participated in tender interviews, such as presenting solutions at the Meteorological Service Singapore (MSS) office</li></ul>

### Projects

2023 - now	<ul style="list-style-type: none"><li><b>CUHK: Climate Dynamic Downscaling Simulation</b> Project Title: CPAS Model Climate Dynamic Downscaling Simulation<ul style="list-style-type: none"><li>To conduct high-resolution, multi-year meteorological and environmental simulations using advanced modeling techniques to analyze historical trends and future climate impacts in the East Asia, South China, and GBA regions.</li></ul></li></ul>
------------	--

## Miscellaneous Experience (continued)

- 2022 - 2024  **Innovation and Technology Fund - Enterprise Support Scheme**  
Project Title: Extreme Weather Prediction for Mega-Cities based on the Global Model CPAS: Enabling Technologies and Delivery
- To develop an advanced system for predicting and mitigating the impacts of extreme weather events in the world's largest metropolitan areas.
- 2020 - 2022  **Innovation and Technology Fund - Enterprise Support Scheme**  
Project Title: High Resolution Numerical Weather Simulation: A commercial service platform for commercial/public sectors, with a sample application on pollution control
- To develop a cutting-edge commercial service platform that provides high-resolution numerical weather simulation capabilities
- 2013 - 2020  **PhD project**  
Supervisor: Prof. Tai Kai Ng (HKUST)  
Project Title: Strongly correlation system and related numerical study
- A Many-Body Ergodic Phase between Two Classes of Many-Body Localized States and The Variational Study on Triangular XXZ Model
- 2016 - 2017  **Projective Symmetry Group (PSG) Project**  
Collaborator: Prof. Zheng-Xin Liu (Department of Physics, Renmin University)  
Project Title: Investigation of the classification problem of spin liquid state on XXZ triangular lattice
- In the previous work, I had finished the Variational Monte Carlo simulation about the spin-liquid type state. And then, Prof. Liu invited me to be a visitor and investigate the classification problem of spin liquid state on XXZ triangular lattice. The main idea comes from XG Wen's paper called Projective Symmetry Group(PSG). It is mainly theoretical work. Finally, we had done the classification analysis. (6/2016-8/2016 and 3/2017-4/2017)
- 3/2016 - 5/2016  **Variational Monte Carlo (VMC) Project**  
Supervisor: Prof. Yi Zhou (Department of Physics, Zhejiang University)  
Project Title: Optimization the trial wavefunction of spin liquid of 1D XXZ+DM spin model
- The project of spin liquid state by Variational Monte Carlo simulation. It is about the 1D XXZ+DM spin model and mainly focused on anisotropic spin spin interaction. Second, use *Tianhe-1* for simulation.
- 2012 - 2013  **Final Year Project**  
Supervisor: Prof. Tai Kai Ng (HKUST)  
Project Title: Superfluid-insulator transition
- The phase diagrams and phase transitions of Bosons with short-ranged repulsive interactions moving in periodic or random external potentials at zero temperature are investigated with emphasis on the superfluid-insulator transition induced by varying a parameter such as the density

## Miscellaneous Experience (continued)

---

2011 – 2012



### **Undergraduate Research Opportunities Program (UROP)**

Supervisor: Prof. Kwok Yip SZETO (HKUST)

Project Title: Prisoner Dilemma Game on Complex Networks

- The prisoner dilemma game is generalized in two aspects in the multi-agent system framework. They are agents have memory and the interaction between agents are defined on a social network. My work focuses on Wheatstone Network and no memory

## References

---

Available on Request