Wai Tong Chung

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Education

Stanford University Stanford, CA
Ph.D. Mechanical Engineering. Advised by Prof. Matthias Ihme. *Sept. 2018 - Exp. June 2024*
Thesis (WIP): *Overcoming Small Datasets in ML Studies of Computational Reacting Flows.*
Research Focus: Machine Learning, AI for Science, High-Performance Computing, Energy.
Courses: Deep Learning, Computer Vision, Mining Massive Datasets, Parallel Computing, Linear Algebra, Numerical Methods, Fluid Mechanics, *etc*.

Imperial College London United Kingdom
B.Eng. M.Eng. Mechanical Engineering. First Class Honours. *Sept. 2013 - Aug. 2017*
Thesis: *Two-dimensional Probability Density Function Model for HCCI Combustion*.

Experience

Stanford University Stanford, CA
Machine Learning Research Assistant *Sept. 2018 - Exp. June 2024*
Investigating ML for multi-physics energy, propulsion, and wildfire modeling.
Wildfire Science Teaching Assistant *Mar 2023 - June 2023*
Developed teaching material for empirical/computational/ML-based wildfire modeling.

Lawrence Livermore National Laboratory Livermore, CA
Deep Learning Research Intern *June 2022 - Sept. 2022*
Explored deep learning methods for climate modeling and COVID-19 drug discovery.

JPMorgan Chase & Co. United Kingdom
Financial Messaging Software Engineer *Sept. 2017 - Aug. 2018*
Developed, deployed, and tested a Java-based global financial messaging application.

Imperial College London United Kingdom
Environmental Engineering Research Assistant *June 2017 - Aug. 2017*
Prototyped light and acoustic sensor networks for flood warning systems in Nepal.

Selected Publications*

P. Sharma, **W.T. Chung**, B. Akoush, M. Ihme. A Review of Physics-informed ML in Fluid Mechanics. *Energies* 16(5):2343 (2023). [.pdf]

W.T. Chung, K.S. Jung, J. H. Chen, M. Ihme. The Bearable Lightness of Big Data: Towards Massive Public Datasets in Scientific ML. In: *ICML AI4Science W.*, 2022. [.pdf]

D.D. Wu, **W.T. Chung**, M. Ihme. ML for Safely Landing on Mars. In: *NeurIPS ML4PS W.*, 2022. [.pdf]

M. Ihme, **W.T. Chung**, A.A. Mishra. Combustion ML: Principles, Progress, and Prospects, *Prog. Energy Combust. Sci.* 91:101010, 2022. [.pdf]

W.T. Chung, A.A. Mishra, M. Ihme. Interpretable Data-driven Methods for Subgrid-scale Closure in LES for Transcritical LOX/GCH4 Combustion, *Combust. Flame* 239:111758, 2022. [.pdf]

W.T. Chung, A.A. Mishra, N. Perakis, M. Ihme. Accelerating High-fidelity Combustion Simulations with Classification Algorithms. In: *AAAI MLPS Spring Symposium*, 2021. [.pdf]

**Refer to my Google Scholar for a complete list.*

Awards

Stanford Climate-Centered AI **Affinity Group Award** 2023
Stanford Human-Centered AI **Graduate Fellowship** 2022-2023
Stanford School of Engineering **Graduate Fellowship** 2018-2019
Imperial College Mechanical Engineering **Most Outstanding Thesis Prize** 2017
Imperial College Mechanical Engineering **Dean's List (Top 10% of Class)** 2017
Imperial College Engineering **Undergraduate Research Award** 2017

Professional Activities

Wrote Google Award for Inclusion Research Grant (Awarded $60,000): *Forecasting wildfire pollutant transport using physics-informed ML*, PI: M. Ihme, 2022. [info]
Wrote NERSC Award Grant (Awarded 11.2M CPU hours): *High-fidelity simulations of multi-mode compression and alternative-fuel effects in rapid compression machines*, PI: M. Ihme, 2022. [info]
Wrote NASA Early Stage Innovations Grant (Awarded $650,000): *Supersonic retropropulsion wind tunnel data analysis*, PI: M. Ihme, 2021. [info]

Invited Speaker, BLASTNet: Curating Scientific Big Data through Outreach and Public Repositories. In: *Technische Universität Darmstadt*, 2023.
Invited Speaker, Potential and Challenges of ML in Industrial and Environmental Reacting Flows. In: *K1st World Symposium*, 2022.
Invited Speaker, The Bearable Lightness of Big Data: Towards Massive Public Datasets in Scientific ML. In: *Stanford HAI Graduate Seminar*, 2022.

Reviewer for *ASME Turbomachinery Technical Conference & Exposition*, 2023.
Reviewer for *International Journal of Engine Research*, 2023.
Reviewer for *ML and the Physical Sciences Workshop at NeurIPS*, 2021, 2022.
Reviewer for *AI for Science: Progress and Promises Workshop at NeurIPS*, 2022.

Session Chair for Turbulent Combustion at the *U.S. Natl. Combust. Meet.*, 2022.
Session Chair for Numerical/Computational Combustion at the *Int. Symp. Combust.*, 2022.

AI/ML Technical Lead for *Stanford Fx Lab (PI: M. Ihme)*, 2022-Present.
Lead organizer for *Stanford HAI Climate-Centered AI Seminar Series*, 2023.
Co-organizer for *Stanford Mechanical Engineering Student Committee*, 2019-2022.
Co-organizer for *Imperial College London Mechanical Engineering Society*, 2016-2017.

Open-source Projects

BLASTNet simulation dataset. [blastnet.github.io]
Multi-GPU deep learning tutorials for 3D datasets. [github.com/blastnet/kaggle_tutorials]
Intro. to ML tutorials. [github.com/IhmeGroup/CombML_Tutorials]

Skills

Programming
Proficient: Python, PyTorch (Lightning), TensorFlow, MATLAB.
Familiar: C++, PyG, Gym, PySpark, MPI, FORTRAN, Java.

Languages
Proficient: English, Malay.
Familiar: Mandarin, Cantonese.