Jian Wei CHEONG

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Curriculum Vitae

Education

2019 - 2023	Doctor of Philosophy, Physics , <i>Nanyang Technological University</i> , Singapore
2015 - 2019	Bachelor of Science, Physics (Honours), Nanyang Technological University, Sin-
	gapore

2010 - 2013 Diploma, Electrical Engineering, Ngee Ann Polytechnic, Singapore

Professional Experience

2024 - current Research Fellow, Nanyang Technological University, Singapore

2023 - 2024 Project Officer, Nanyang Technological University, Singapore

2012 Intern, ST Electronics, Singapore

Teaching Assistant (Nanyang Technological University)

Year	Course
2021	PH3101 Quantum Mechanics 2
2020	PH1199 Physics Lab 1B
2019	PH1198 Physics Lab 1A

Awards & Achievements

2019	Short-speech Contest	Best Presentation	(PAP701	Graduate	seminar	module),
	Nanyang Technological					

2017/2018 Dean's List (top 5% of cohort), Nanyang Technological University, Singapore

2016/2017 **NTU President Research Scholar** (completing URECA), Nanyang Technological University, Singapore

2011 Director's List (top 5% of cohort), Ngee Ann Polytechnic, Singapore

2011 **Best Performance, Programmable Logic Device** (top student of cohort), Ngee Ann Polytechnic, Singapore

2010 **Best Performance, Digital Electronics & Practice** (top student of cohort), Ngee Ann Polytechnic, Singapore

List of Publications

- 1. J. W. Cheong, A. Pradana, and L. Y. Chew, **Non-Markovian refrigeration and heat flow in the quantum switch**, Physical Review A, 110(2), 022220 (2024).
- 2. L. Y. Chew, A. Pradana, L. He, and J. W. Cheong, **Stochastic thermodynamics of finite-tape information ratchet**, European Physical Journal Special Topics (2023).
- 3. J. W. Cheong, A. Pradana, and L. Y. Chew, Effects of non-Markovianity on daemonic ergotropy in the quantum switch, Physical Review A, 108(1), 012201 (2023).
- 4. L. He, J. W. Cheong, A. Pradana, and L. Y. Chew, **Effects of correlation in an information ratchet** with finite tape, Physical Review E, 107(2), 024130 (2023).
- 5. J. W. Cheong, A. Pradana, and L. Y. Chew, **Communication advantage of quantum compositions** of channels from non-Markovianity, Physical Review A, 106(5), 052410 (2022).
- 6. L. He, A. Pradana, J. W. Cheong, and L. Y. Chew, Information processing second law for an information ratchet with finite tape, Physical Review E, 105(5), 054131 (2022).

Skill Level Comment Computer languages Julia 3+ years experience, used in main work R 2 2 2 2 2 back chrowledge RC / C++ 2 2 2 2 basic knowledge RC / C++ 2 2 2 2 basic knowledge RC / C++ 2 2 2 2 basic knowledge B+ years experience, used in main work B+ years experience, used in passive projects P+ years experience, used in passive projects B- years experience, used in passive projects		Technical Experience				
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C / C++ MATLAB MATL	languages	Julia	>_ >_ >_ >_	3+ years experience, used in main work		
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Miscellaneous Projects

- Strain estimation for hazard forecastings before and after 2011 Japan Tohoku earthquake ES7008 Geophysical Data Analysis, NTU
 - ► Analyzed seismic GPS displacement data in Python.
 - Estimated seismic strains with velocity fields using Delaunay triangulation.
 - Demonstrated correlations between earthquake event hotspots and strain hotspots, before and after Tohoku earthquake.

Variations in statistical complexity of genome sequences across species

CE7412 Computational and Systems Biology, NTU

- Analyzed genome sequences of human, chimpanzee, rhesus macaque, dog, and fruit fly, from GenBank assembly in R.
- Applied the Baum-Welch algorithm and Akaike information criterion to compute the average statistical complexity of their genomes.
- Suggested that increased biological complexity corresponds to decreased statistical complexity in genomes.

Detecting adversarial attack of deep neural networks for image recognition from image complexity

PH3502 Chaotic Dynamical Systems, NTU

- ► Trained image recognition deep neural networks with MNIST, Fashion-MNIST, and CIFAR10 datasets in Python.
- Applied adversarial attacks such as Fast Gradient Sign Method (FGSM), DeepFool,
 One Pixel Attack, Jacobian-Based Saliency Map Attack (JSMA).
- Showed that FGSM and DeepFool can be detected from its increased image complexity.

Monte Carlo photon transport in multi-layered biological tissues

PH4505 Computational Physics, NTU

- Simulated photon transports in biological tissues by means of random walk in Python.
- Demonstrated the applications of computational methods on medical areas such as biomedical imaging and photon therapy.

Monte Carlo simulation of periodic-driven Brownian particles

PAP723 Numerical Methods for Physicists, NTU

- Simulated 2D toy model of attractive Brownian particles that obeys the Arrhenius equation for the formation and destruction of bonds in Python.
- Demonstrated that the system tends to configurations that result in increased entropy production when driven with a periodic driving force.

• Designing, programming, 3D printing, and building a hovering quadcopter drone Making and Tinkering Lite 1, NTU

- Programmed a Arduino microcontroller.
- ▶ Designed printed circuit board (PCB) in Autodesk EAGLE.
- Designed and 3D printed drone in Autodesk Fusion 360.
- Simulated physical system in COMSOL Multiphysics.