Jian Wei CHEONG

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Curriculum Vitae

Education

2019 - 2023	**Doctor of Philosophy, Physics**, *Nanyang Technological University*, Singapore
2015 - 2019	**Bachelor of Science, Physics (Honours)**, *Nanyang Technological University*, Singapore
2010 - 2013	**Diploma, Electrical Engineering**, *Ngee Ann Polytechnic*, Singapore

Professional Experience

2024 - current	**Research Fellow**, *Nanyang Technological University*, Singapore
2023	**Project Officer**, *Nanyang Technological University*, Singapore
2012	**Intern**, *ST Electronics*, Singapore

Teaching (Nanyang Technological University)

Year	Course
Summer 2025	Physics Discovery Camp - Computational Nonlinear Lab
2025	PH3101 Quantum Mechanics 2 (Restricted Repeat)
Summer 2024	Physics Discovery Camp - Computational Nonlinear Lab
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 University, Singapore
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

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)*.

Conferences

Posters

1. J. W. Cheong, A. Pradana, and L. Y. Chew[†], **Enhancement of quantum processes from indefinite causal order through non-Markovianity**, *29th International Conference on Statistical Physics (STATPHYS29), Florence, Italy, July 2025*.
2. J. W. Cheong[†], A. Pradana, and L. Y. Chew, **Non-Markovian refrigeration and heat flow in the quantum switch**, *Quantum Thermodynamics Conference 2025 (QTD2025), Singapore, July 2025*.
3. L. Y. Chew[†], J. W. Cheong, and A. Pradana, **Enhancement of quantum processes from indefinite causal order through non-Markovianity**, *XLV Dynamics Days Europe 2025 (DDE2025), Thessaloniki, Greece, June 2025*.
4. L. Y. Chew[†], L. He, A. Pradana, and J. W. Cheong, **Stochastic thermodynamics and correlation effects of finite-tape information ratchets**, *28th International Conference on Statistical Physics (STATPHYS28), Tokyo, Japan, August 2023*.

[†]Presenting author.

Technical Experience

	Skill	Level	Comment
Programming	Python	▰▰▰▰	8+ years experience, used in main work
	Julia	▰▰▰▰	3+ years experience, used in main work
	R	▰▰▱▱	bachelor course, compution al biology projects
	C / C++	▰▰▱▱	bachelor course, undergrad projects
	MATLAB	▰▰▱▱	bachelor course, undergrad projects
	Haskell	▰▱▱▱	personal quantum computation projects
	Racket	▰▱▱▱	personal quantum computation projects
	Bash / sh	▰▰▰▱	personal Linux projects
	Quarto	▰▰▰▱	website, presentations, and reports
	LaTeX / Typst	▰▰▰▱	presentations, reports, and published papers
	HTML / CSS	▰▰▱▱	personal website
Software	Arduino	▰▰▱▱	bachelor & diploma courses, programming drone
	Fusion 360	▰▰▱▱	bachelor course, 3D printing drone
	Origin Pro	▰▰▱▱	bachelor course, plotting lab results
	EAGLE	▰▱▱▱	bachelor course, printing drone PCB
	LabVIEW	▰▱▱▱	bachelor & diploma courses, interfacing with sensors
	AutoCAD	▰▱▱▱	diploma course, designing electrical circuits
	Sketchup	▰▱▱▱	personal 3D printing projects

▰▱▱▱ basic knowledge   ▰▰▰▱ extensive knowledge

▰▰▱▱ intermediate knowledge   ▰▰▰▰ expert knowledge

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.