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 - 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 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

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).

Technical Experience

	Skill	Level	Comment
Computer languages	Python	●●●●	8+ years experience, used in main work
	Julia	●●●●	3+ years experience, used in main work
	R	●●○○	bachelor course, computional 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.