CHARLOTTE CHANG LE LOH

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Github: https://github.com/clott3

RESEARCH INTERESTS

My main research interests are in the intersection of machine learning and science: I am interested to improve state-of-the-art machine learning techniques by using insights from Physics and I am also interested in improving the applicability of machine learning tools to a wide range of problems in science and engineering. Currently, I am focused in the area of self-supervised learning, where I explore conditions necessary for state-of-the-art methods like SimCLR, BYOL, SimSiam to work well and why. While these techniques are often applied to problems in computer vision, I also explore how to improve their applicability and functionality to problems in science and engineering.

EDUCATION

Massachusetts Institute of Technology
PhD, Electrical Engineering and Computer Science — 2019 – present
Thesis Advisor: Prof. Marin Soljačić

Master of Science, Electrical Engineering and Computer Science — 2019 – 2021
Thesis Advisor: Prof. Marin Soljačić

University of Cambridge
Master of Advanced Studies, Physics — 2014 – 2016
Thesis Advisor: Dr. Akshay Rao, Dr. Aditya Sadhanala

Imperial College London
Bachelor of Science, Physics with Theoretical Physics — 2011 – 2014
Thesis Advisor: Prof. Stefan Maier

PROFESSIONAL EXPERIENCE

DSO National Laboratories, Singapore — 2016 – 2019
Member of Technical Staff, Functional and Smart Materials Lab

Research Areas: Meta-surfaces for tailoring wavefronts on complex geometries;
Origami & Kirigami architectures for volumetric electromagnetic tunability

PUBLICATIONS AND PREPRINTS

1. Surrogate- and invariance-boosted contrastive learning for data-scarce applications in science. (2021) **Charlotte Loh**, Thomas Christensen, Rumen Dangovski, Samuel Kim and Marin Soljačić. 2021. Under Review. arXiv preprint at arXiv:2110.08406

2. Scalable and Flexible Deep Bayesian Optimization with Auxiliary Information for Scientific Problems. (2021) Samuel Kim, Peter Lu, **Charlotte Loh**, Jamie Smith, Japser Snoek and Marin Soljačić. Under Review. arXiv preprint arXiv:2104.11667

3. Predictive and generative machine learning models for photonic crystals. (2020) Thomas Christensen, **Charlotte Loh**, Stjepan Picek, Domagoj Jakobović, Li Jing, Sophie Fisher, Vladimir Ceperic, John D. Joannopoulos and Marin Soljačić. Nanophotonics 9 (13), 4183-4192

AWARDS

DSO Postgraduate Scholarship — 2018
DSO National Laboratories, Singapore

DSO Innovation Award — 2018
DSO National Laboratories, Singapore

Corpus Christi Postgraduate Prize in Physics — 2016
Corpus Christi College, Cambridge University, UK

Runner-up Prize in Second Year Physics Essay — 2013
Physics Department, Imperial College London, UK

Defence Science & Technology Agency Undergraduate Scholarship — 2011
Defence Science & Technology Agency, Singapore

PROFICIENCY

Coding/Software: Python, C++, MATLAB, PyTorch, TensorFlow, LaTeX, Adobe Illustrator, Inkscape

Spoken: English, Mandarin Chinese