Charlie B. Tan

charlie.tan@cs.ox.ac.uk charliebtan.github.io

Education

University of Oxford Oct 2023 - Present
DPhil Computer Science
Supervised by Prof. Michael Bronstein
Funded by EPSRC Scholarship

University of Cambridge Oct 2022 - Jun 2023
MPhil Advanced Computer Science
Pass with Distinction - **78%**
Dissertation: Rethinking Proximal Optimization for Deep Learning — Developed novel optimizer for supervised learning, derived to achieve exact **natural gradient descent** without explicit construction of Hessian
Supervised by Prof. Ferenc Huszár
Funded by Departmental Award

University of Bristol Sep 2019 - Jun 2022
BEng Electrical and Electronic Engineering
First Class Honors - **82%** - **Ranked #1 in Department**
Dissertation: Learned Image Compression with Transformers — Developed an end-to-end-learned image compression algorithm based on the **Vision Transformer**

Professional Experience

InstaDeep May 2024 - Oct 2024
PhD Research Intern — Generative Modeling for Biology
Bayesian Flow Networks
- Researched methods for fast sampling from Bayesian Flow Networks (**score-based generative model**)
- Contributed to upcoming papers applying Bayesian Flow Networks to **protein design**, and on the fundamentals of **multimodal modeling** with Bayesian Flow Networks

Visual Information Laboratory, University of Bristol Jun 2021 - Sep 2021
Research Intern — Generative Modeling for Visual Media
Video Super Resolution with Generative Adversarial Networks
- Developed and evaluated novel low-complexity architecture topology, exploiting the spatial redundancy of YCbCr video to further **reduce latency 4x without loss of evaluation performance**
- Leveraged **distributed data parallel** training on multi-GPU HPC clusters, enabling more rapid experimentation

Publications and Preprints

Beyond the Boundaries of Proximal Policy Optimization Preprint - Under Review
Charlie B. Tan*, Edan Toledo, Benjamin Ellis, Jakob Nicolaus Foerster, Ferenc Huszár*

On the Limitations of Fractal Dimensions as a Measure of Generalization NeurIPS 2024
Charlie B. Tan**, Inés García-Redondo*, Qiquan Wang*, Michael M. Bronstein, Anthea Monod*

Geodesic Mode Connectivity ICLR 2023 TinyPapers
Charlie B. Tan*, Theodore Long, Sarah Zhao, Rudolf Laine* *Oral (Top 6%)*

Teaching

Department of Computer Science, University of Oxford Oct 2023 - Present
Demonstrator
Modules: Machine Learning, Geometric Deep Learning

Department of Electrical and Electronic Engineering, University of Bristol Sep 2020 - Jan 2022
Teaching Assistant
Modules: Linear Circuits, Electronics I, Digital Circuits and Systems

Relevant Skills

- Proficient with **Linux** systems, basic system administrator duties for academic cluster
- Six years experience with **Python**, including object oriented programming
- Familiar with software engineering practices including **Git**, **Docker**, **PostgreSQL**
- Three years using **PyTorch** in a wide variety of machine learning projects
- One year experience with projects exclusively in **JAX**
- Extensive experience employing **high performance computing** resources, including multi-GPU distributed training
- Experience with **Google Cloud Compute** resources