Mufeng Tang

MRC Brain Network Dynamics Unit, University of Oxford
OX1 3TH Oxford, UK
mufeng.tang@ndcn.ox.ac.uk
c16mftang.github.io

EDUCATION

University of Oxford — Oxford, UK
DPhil (PhD) Computational Neuroscience — *2021 - 2024 (expected)*
Research topic: *Biologically plausible neural network models of the hippocampal formation.*

University of Chicago — Chicago, IL
MS Statistics, **GPA:3.8/4.0** — *2019 - 2021*

University College London — London, UK
BASc Science and Engineering, **First Class Honours** — *2016 - 2019*

PUBLICATIONS/PREPRINTS

Tang, M., Salvatori, T., Millidge, B., Song, Y., Lukasiewicz, T. and Bogacz, R., 2022. "Recurrent predictive coding models for associative memory employing covariance learning". **Under revision**. [BioRxiv] Code

Tang, M., Yang, Y. and Amit, Y., 2022. "Biologically plausible training mechanisms for self-supervised learning in deep networks". **Frontiers in Computational Neuroscience**. [URL] Code

REFEREED CONFERENCE ABSTRACTS

Tang, M., Salvatori, T., Millidge, B., Song, Y., Lukasiewicz, T. and Bogacz, R., 2022. "Associative memory via covariance-learning predictive coding networks". In: Memory in Artificial and Real Intelligence Workshop at the **36th Conference on Neural Information Processing Systems (NeurIPS).** URL

RESEARCH EXPERIENCE

Grossman Center for Quantitative Biology and Human Behavior — Chicago, IL
Research Intern — *Aug 2020 - Dec 2021*
Advisor: Prof. Jason MacLean

- Investigated **spiking neural network** models for neocortical processing of dynamic sensory inputs, and **convolutional neural networks** as models of the visual processing in rodents;
- Co-developed an **open-source tool in TensorFlow** facilitating the modelling of brain responses using spiking neural networks.

University of Chicago, Department of Statistics — Chicago, IL
Student Researcher, — *June 2020 - Sep 2021*
Advisor: Prof. Yali Amit

- Proposed that **self-supervised learning** underlies the representation learning in biological visual systems, and proposed **biologically plausible** training methods for self-supervised neural networks as an alternative to the biologically unrealistic backpropagation;
- Neural network models trained with our methods achieved **comparable performance** to mainstream backpropagation-based models such as SimCLR.

UCL Centre for Advanced Spatial Analysis — London, UK
Undergraduate Researcher — *Oct 2018 - June 2019*
Advisor: Prof. Steven Gray

- Performing **sentiment classification** of real-time, traffic-related textual content on Twitter using statistical and machine learning methods;
- By associating sentimentally classified Twitter content with their geolocation data, the models accurately predicted official congestion areas released by TfL, represented as the amount of Twitter content with negative sentiment within a region.

COMPETITIONS

Kaggle ASHRAE Great Energy Predictor, Silver Medal (among 3,600 teams)
Kaggle Competition, group project *Dec 2019*

- Modelling **time-dependent energy consumption data** released by The American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE);
- Our model combined conventional statistical methods for time-series data (wavelet transform) with machine learning models (LightGBM) and achieved accurate predictions in the unseen test data in the competition.

AWARDS AND SCHOLARSHIPS

University of Oxford, **St Cross E.P. Abraham Scholarship £15,000/annum** *Sep 2021*
University of Chicago, **tuition scholarship for academic excellence $5540/quarter** *July 2020*
University of Chicago, **tuition scholarship $4610/quarter** *July 2019*

TEACHING EXPERIENCE

Supervisor of MSc projects at University of Oxford *Winter 2022*
MSc Mathematics Thesis Project

Teaching assistant at University of Chicago *Spring 2021*
STAT25025 Machine Learning and Large-scale Data Analysis

SKILLS

Programming Languages and Frameworks
Python (PyTorch, Tensorflow, Scikit-learn), R, Matlab, Java, CSS, HTML