Catherine Tong

Contact Details

Department of Computer Science, University of Oxford, Oxford, UK
Email: egctong@gmail.com Web: egctong.github.io

Education

2017–2021 **Doctor of Philosophy (DPhil)**, *University of Oxford*, *Computer Science*.
Supervised by Associate Prof. Nicholas D. Lane.
Thesis: Machine Learning on Human Behavioural Data.

2013–2017 **Master of Physics (MPhys)**, *University of Oxford*, *Physics*.
Focus: Theoretical Physics and Atmospheric Physics.
Graduated with First Class Honours.

Research Interests

Ubiquitous Sensing · ML for health · Multi-modal deep learning · Wearable cameras

My current research focuses on developing machine learning methods which model varieties of behavioural data collected through everyday sensing devices. I am particular interested in developing solutions to the sparse data problem in human activity recognition, through leveraging multiple modalities and domain knowledge.

Publications

2020 Hyeokhyen Kwon*, **Catherine Tong***, Harish Haresamudram, Yan Gao, Gregory D. Abowd, Nicholas D. Lane, and Thomas Plötz. IMUTube: Automatic Extraction of Virtual on-body Accelerometry from Video for Human Activity Recognition. Accepted to *IMWUT Volume 4 Issue 4* with minor revisions.

*Equal Contributions

2020 **Catherine Tong**, Shyam A. Tailor, and Nicholas D. Lane. Are Accelerometers for Activity Recognition a Dead-end? In *The 21st International Workshop on Mobile Computing Systems and Applications (Hotmobile '20)*.

2019 **Catherine Tong**, Matthew Craner, Matthieu Vegreville, and Nicholas D. Lane. Tracking Fatigue and Health State in Multiple Sclerosis Patients Using Connected Wellness Devices. In *IMWUT, Volume 3 Issue 3.* Also in *MobiUK '19*.

2018 Valentin Radu, **Catherine Tong**, Sourav Bhattacharya, Nicholas D. Lane, Cecilia Mascolo, Mahesh K. Marina, and Fahim Kawsar. Multimodal Deep Learning for Activity and Context Recognition. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 1 Issue 4.* Also in *MobiUK '18*.

2018 **Catherine Tong**, Gabriella M. Harrari, Angela Chieh, Otmane Bellahsen, Matthieu Vegreville, Eva Roitmann and Nicholas D. Lane. Poster: Inference of Big-Five Personality Using Large-scale Networked Mobile and Appliance Data. In *The 15th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys '18)*.

2018 Vincent WS. Tseng, Sourav Bhattacharya, Javier Fernández Marqués, Milad Alizadeh, **Catherine Tong**, and Nicholas D. Lane. Deterministic Binary Filters for Convolutional Neural Networks. In *The 27th International Joint Conference on Artificial Intelligence (IJCAI '18)*.

2017 **Catherine Tong**, Omar A. Guerrero, Eduardo Lopez and Felix Reed-Tsochas. Diffusing Workers in a Multiplex World. Master's thesis, *SSRN:3056730*.

Work Experience

June 2020 – Present **Frontier Development Lab**, *Machine Learning Researcher*.
Focus: Enabling global medium-range precipitation forecasts from satellite imagery.
I am part of the Digital Twin Earth team.
We are developing a novel multi-modal system which incorporate physical understanding into a deep learning approach for skillful forecasts across the globe.

June – Sep 2019 **Microsoft Research, Cambridge**, *Research Intern*.
Focus: Understanding the behaviours of mental health patients on an online Cognitive Behavioural Therapy platform.
I was part of Project Talia in the Healthcare Intelligence group.
We developed a deep learning framework to analyze and predict health outcomes (as measured by depression scores) by modelling patients' browsing trajectories and relevant site content.

June – Sep 2017 **Nokia Bell Labs, Cambridge**, *Research Intern*.
Focus: Analyzing multi-modal deep learning models for activity and context recognition.
We compared the performance of different multi-modal setups. We also trained machine learning models to analyze health-related data collected by smart appliances in the *Withings* range.

May – July 2017 **Centre for Agent-Based Dyanmic Networks, University of Oxford**, *Research Assistant*.
Focus: Modelling the labour economy using methods from Statistical Physics.
We formulated and solved an agent-based Markov model on multiplex networks to describe the movement of labour across the economy. We analyzed the approach on UK labour survey data.

May 2020 – Present **Ufonia**, *Part-time Researcher*.
Focus: Automating post-surgery phone conversations with NHS patients.
We are developing a knowledge-graph-based approach to structure incoming conversation data.

Selected Activities

2020-Present **President**, Oxford Women in Computer Science

2019-Present **Membership Co-Chair**, N2Women Board

2020 **Teaching Assistant**, *Foundamentals of Sensing*

2014-2017 **Undergraduate Mentor**, Oxford Women in Physics

2014-2015 **Volunteer Tutor**, Jacari

Awards

2017-2022 EPSRC DPhil (PhD) Scholarship

2018, 2020 ACM Student Travel Award

2016 Examiners' Commendation for Best Practical Work in Physics

2013-2017 College Scholarship for Outstanding Performance in Physics Exams