Douglas Tilley

PhD Candidate in Accountable, Responsible and Transparent Artificial Intelligence, Co-Founder @ Dot Research Ltd.

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Personal Profile

Published and award-winning Robotics PhD Candidate at ART-AI CDT at the University of Bath, with a proven track record in developing multimodal deep learning models for human–robot interaction and robotics. Experience in bridging complex **theoretical ML concepts**, including **neuromorphic computing** and **explainable VAEs** and applying them to the real world. **Multiple Q1 publications** in various domains, as well as co-founding Dot Research Ltd, designing **field-tested, patent-pending TinyML vision sensors**. Strong networking ability and international collaborations with leading global research institutes. A committed, adaptable, and hard-working individual, constantly striving for innovation and tangible results in both the academic and industrial sectors.

Work Experience

CTO & Machine Learning Researcher Dot Research Ltd   *Bristol, UK*   *Aug 2024 - Current*

- Development of TinyML Wildlife Conservation embedded sensors for novel environments.
- Custom GenAI Pipeline for out of distribution domain adaption.
- TinyML deployment of custom Computer Vision Deep Learning Architectures.
- Proven prototype deployment in remote, harsh environments (patent pending).

Machine Learning Researcher National Institute of Informatics (NII)   *Tokyo, Japan*   *Oct 2024 – Mar 2025*

- Primary lead on **neuromorphic computing** research using hybrid architectures.
- Utilizing **State Space Models** with **SNNs** for explainable temporal modeling on noisy data.
- Implementing advanced representation and explainability techniques using hybrid VAEs.
- Collaborating with 3 international research institutes on improving Deep Learning Optimizers.

Data Scientist Tianjin University   *Tianjin, China*   *Nov 2023 – Mar 2024*

- Led pioneering research on three first-of-their-kind multimodal human activity recognition studies (n=25), integrating novel sensor combinations.
- Integrated motion capture systems (**Noraxon, VICON, Neuracle**) for long duration, high fidelity, synchronized data collection.
- Development of tools for precise time synchronisation, feature generation and automatic data labelling.

University Demonstrator University of Bath   *Bath, UK*   *Sep 2021 – Present*

- **Mentor** for PhD students and **Demonstrator** for AI and Prototype Engineering.
- Technical advisor for UAV related PhD and Masters projects and Team Bath Drones (Award winning).
- Demonstrator for ROS, Computer Vision, Deep Learning and Advanced Control.

Research Assistant University of Bath   *Bath, UK*   *Jul 2019 – Sep 2021*

- Led international collaborations between 4 different higher education institutions.
- Chief Pilot and Field Engineer for UAV operations using bespoke self-built UAVs, including **BVLOS** missions up to 6000 ft.
- Produced novel research outputs featured in media (**Sky, ITV, Guardian**).

Additional Experience University of Plymouth; UKRI STFC   *Plymouth; Edinburgh; Harwell, UK*   *Jan – Jul 2019; Jul – Aug 2014*

- Course Representative at University of Plymouth.
- UKRI Summer Placements at Royal Observatory Edinburgh and Rutherford Appleton Labs Space (Robotics).

Publications

Journal Articles

Hierarchical Deep Learning for Human Activity Recognition Integrating Postural Transitions
  Douglas J. Tilley, Uriel Martinez-Hernandez
  IEEE Sensors Journal 24.24 (2024) pp. 40305–40312. 2024

Ionic Charge Emission Into Fog From a Remotely Piloted Aircraft
  R. Giles Harrison, Keri A. Nicoll, Graeme J. Marlton, Douglas J. Tilley, Pejman Iravani
  Geophysical Research Letters 49.19 (2022). 2022

Demonstration of a Remotely Piloted Atmospheric Measurement and Charge Release Platform for Geoengineering
  R. Giles Harrison, Keri A. Nicoll, Douglas J. Tilley, Graeme J. Marlton, Stefan Chindea, Gavin P. Dingley, Pejman Iravani, David J. Cleaver, Jonathan L. Bois, David Brus
  Journal of Atmospheric and Oceanic Technology 38.1 (2021) pp. 63–75. American Meteorological Society, 2021

Conference Proceedings

Shallow Hierarchical CNN-LSTM for Activity Recognition to Integrate Postural Transition States
  Douglas Tilley, Uriel Martinez-Hernandez
  2023 IEEE SENSORS, 2023

Electrostatic Charging of Propellers on Unmanned Aerial Vehicles
  Douglas Tilley, Kerianne Nicoll, Pejman Iravani, David Cleaver, Jonathan Du Bois
  2021 ESA Annual Meeting, 2021, Online

Skills

Programming	Python [**NumPy**, **Pandas**, **OpenCV**], C/C++, **ROS**(1/2), MATLAB, Git, Docker
Machine Learning	Neural Networks [**CNN**, **LSTM**, **Transformer**, **SNN**, **VAEs**, **SSMs**], **GenAI**, PyTorch, Keras, XGBoost
Research Tools	**LaTeX**, Linux, Bash, Jupyter (Data Analysis), **Statistical Methods**, Experiment Design
Hardware	Robotics Systems, UAV Design, Sensor Integration, Embedded Systems, PCB Design, Soldering
Soft Skills	Technical Writing, Research Leadership, International Collaboration, Project Management, Presentation Skills

Education

University of Bath Smart Cyber-Physical Systems for Multimodal Human-Robot Collaboration   *Bath, UK*   *Sept 2021 - Current*

- Integrated MPhil in Accountable, Responsible and Transparent Artificial Intelligence (ART-AI).
- **Student Doctoral Recognition Award winner 2024.**
- University of Bath 3 Minute Thesis **Finalist** 2024.
- Oxford MLx[Fundamentals, GenAI, Health AI, Representation] Summer School 2025 ; Cambridge Health & AI Summer School 2025

University of Plymouth Robotics MEng (Hons)   *Plymouth, UK*   *Sept 2015 - 2019*

- Course Representative
- 5th Year Modules: Advanced Intelligent Robotics, Advanced Robot Design, Science and Technology of Autonomous Vehicles, MEng Project.
- MEng: Multi-Sensor Integration Safety Awareness Harness (1st Class); BEng: Automatic Trajectory Planning for Far-Peripheral Vision (1st Class)