Alex Williams

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Education

PhD. Artificial Intelligence and Music — 2022 – 2026 (Expected)

Queen Mary University of London, in collaboration with Sony CSL

I am currently a full-time PhD student in the UKRI Centre for Doctoral Training in Artificial Intelligence and Music. I am researching user-driven deep music generation for electronic music producers and DJs, under the supervision of Dr. Mathieu Barthet (QMUL) and Dr. Stefan Lattner (Sony CSL). This multidisciplinary research cuts across areas including deep learning for audio, computational creativity, human-computer interaction, and a range of music information retrieval and generation tasks.

As part of the PhD, I am undertaking continuous professional development and have completed several compulsory taught modules: *Research Methods and Responsible Innovation; Deep Learning for Music and Audio; Machine Learning; Music Informatics; Music and Audio Programming; Computational Creativity.*

MSc. by Research: Artificial Intelligence and Robotics — 2018 – 2021

Swansea University

I conducted research into the application of deep reinforcement learning (RL) for industrial robotic control for a real-world manufacturing task. The approach utilised multi-modal sensor inputs including dual-vision and position / velocity sensors. This research included the design and implementation of a simulation in a RL gym environment and the application and optimisation of deep RL algorithms for learning a control task. This research was motivated by challenges in the aerospace manufacturing industry at AIRBUS and was completed part-time whilst employed full-time as a research assistant at Swansea University.

BSc. Hons. Computer Science: First Class, — 2015 – 2018

University of Liverpool

Modules:

Advanced Object-Oriented Programming; Artificial Intelligence; Bio-Inspired Optimisation; Complexity of Algorithms; Database Development; Decision, Computation and Language; Efficient Sequential Algorithms; Formal Methods; Human-Centric Computing; Logic; Mobile Computing; Multi-Agent Systems; Operating System Concepts; Principles of C and Memory Management; Professional Skills; Robotics and Autonomous Systems; Scripting Languages; Software Engineering.

Undergraduate Thesis: *A Robot That Learns to Crawl via Reinforcement Learning*

***Group Project*:** Multiplayer games website with game AI functionality: *fourgames.uk*

Employment

Chief AI Officer *(part-time)*: *Mariposa AI* — 2024 – Present

Mariposa is a start-up developing a *slow-dating* app that provides a new first date each week and seeks to offer a kinder way of dating. I am primarily responsible for the research, development, and integration of AI-based features alongside other organisational matters.

Research Assistant: *ASTUTE, Swansea University* 2018 – 2023

Contributing to the delivery of wide-ranging industry-led collaborative research, development, and innovation projects. I provided practical and theoretical expertise in Industry 4.0. research areas including robotics and automation systems, artificial intelligence, The Internet of Things (IoT), sensors, computer vision, human-computer interaction and more.

Responsibilities:

- Collaborating with industrial partners to identify opportunities for innovation and subsequently developing research project proposals
- Writing, publishing and presenting scientific work in academic journals and conferences, and performing peer-review
- Performing complex technical work for a variety of research applications within my areas of expertise
- Presenting to industrial, professional, governmental (including the First Minister of Wales), academic and general audiences at conferences, networking events, meetings, and outreach activities
- Supporting student and collegial research by providing supervision and direction of undergraduate student projects, technical support for PhD students and colleagues, and managing laboratory activity

Other Skills

Languages:

- English (Native), French (Intermediate), Welsh (Intermediate)

Music:

- Self-taught musician and DJ of 13 years composing, producing, and mixing; releasing original music, sound design for games and visual media, and radio shows / DJ mixes
- Music production + technology: Ableton Live, Audacity, Rekordbox; Piano, bass, CDJs, turntables, and electronic music setups involving synthesizers, sequencers etc.

Published Works

- A. Williams, H. Tian, S. Lattner, M. Barthet, C, Saitis, ***'Deep Learning-based Audio Representations for the Analysis and Visualisation of Electronic Dance Music DJ Mixes'***, at the AES International Symposium on AI and the Musician, 2024
- A. Williams, S. Lattner, and M. Barthet, ***'Sound-and-Image-Informed Music Artwork Generation Using Text-to-Image Models****' at the Music Recommender Systems Workshop at the 17th ACM Conference on Recommender Systems, 2023*
- A. Williams, S. Lattner, M. Barthet, ***'User Driven Music Generation in Digital Audio Workstations'*** (*poster*), Digital Music Research Network +17 Conference, 2022
- H. Matallah, A. Williams, A. Javied, F. Belblidia, A. Fahmy, and J. Sienz**; 'A Deep Reinforcement Learning Approach to BEV Powertrain Optimisation'**, at the 9th International Conference on Sustainable Design and Manufacturing, 2022
- A. Williams, ***'Real-Time Visual Servoing of a Redundant Manipulator via Deep Reinforcement Learning'***; Master's Thesis; Swansea University, 2021
- A. Williams, M. Torquato, I. Cameron, A. Fahmy, and J. Sienz, **'Survey of Energy Harvesting Technologies for Wireless Sensor Networks'**, IEEE Access, 2021
- M. Torquato, K. Lakshmanan, N. Narozanska, R. Potter, A. Williams, F. Belblidia, A. Fahmy, J. Sienz, '***Cascade Optimisation of Battery Electric Vehicle Powertrains'***, at the 25th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems, 2021