

Willem Davison

1/1 Leamington Place
Edinburgh, EH10 4JR

w.davison@ed.ac.uk
+44 7480 199344

Personal Statement

AI, Robotics, and Computer Vision PhD student on SPADS CDT at the University of Edinburgh with a 1st class MSci in Theoretical Physics. Specialising in dynamics and motion modeling for applications in efficient video understanding and deployable robotic control. Combining proven professional engineering experience with advanced Python and PyTorch development to build scalable, end-to-end AI architectures.

Research and Professional Experience

University of Edinburgh, School of Informatics

August 2024 - Present

PhD Researcher under Dr Laura Sevilla-Lara's supervision

Paper Submission - Authored "It's a Matter of Time: Three Lessons on Long-Term Motion for Perception" (Under Review) | [Preprint arXiv ID: [2602.14705](https://arxiv.org/abs/2602.14705)]

- **Architectures:** Proposed MovT, a novel Transformer architecture that leverages sparse point-tracks (via CoTracker3) to outperform pixel-based baselines.
- **Efficiency:** Developed a late-fusion technique with VideoMAE that increased model accuracy by 44% while adding only 0.45 GFLOPs of compute, directly addressing the trade-off between performance and computational cost.
- **Data Engineering:** Engineered distributed GPU HPC pipelines using Bash and PyTorch to process ~100k videos (SSV2, Jester), extracting low-dimensional signals from noisy raw data.
- **Interpretability:** Visualised saliency maps demonstrating that the model implicitly learns skeletal structures from point data, offering interpretable insights for motion analysis.

Ongoing Research: "Anticipatory VLAs" - Modeling temporal dynamics to adapt robot actions endowing frozen VLAs with dynamic manipulation capability while preserving their task-level competence.

BAE Systems

October 2023 - August 2024

Lead Electromagnetics Engineer

- Designed experiments and developed C++ applications for the statistical analysis of raw material measurements from vector network analysers.
- Implemented numerical models to infer and compare key material properties from noisy data.
- Managed and mentored junior apprentices, leading to promotion to placement manager responsible for overseeing project development, providing technical guidance, and apprentice interviews.

Skills

Programming Languages: Python (Advanced), C++ (Advanced), Bash (Advanced).

Python Libraries: NumPy, Pandas, PyTorch, TensorFlow, Scikit-learn, SciPy, Matplotlib.

AI, Robotics, & Computer Vision Expertise: Foundation Models, Video Understanding, Transformers, IsaacSim, Reinforcement Learning, Point-Tracking.

Education

University of Nottingham

September 2019 – May 2023

Physics with Theoretical Physics MSci - 1st Class (74% Overall)

- **Thesis Project:** Derived supersymmetric black hole solutions to the Einstein-Maxwell field equations by exploiting advanced differential spinorial geometry methods.

Durham Johnston Comprehensive School - Sixth Form

September 2017 – June 2019

A*, A*, A* (Physics, Maths, and Further Maths)

Scholarships, University of Nottingham

First Year Academic Excellence Scholarship

2020

Sir Peter Mansfield Scholarship

2019