Oliver Boyne

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I am a PhD candidate in computer vision and 3D reconstruction. I work on the cutting edge of computer vision, with a focus in 3D reconstruction of rigid and articulated subjects. Currently, I am using synthetic data to create large scale datasets, training for downstream 3D reconstruction tasks, including inference on mobile devices.

Education

PhD in Computer Vision — **Downing College & Cambridge University Engineering Department**
Python | PyTorch | Blender | Swift — 2021 - Present

Supervised by **Roberto Cipolla**, and sponsored by **Trya Srl**. Research target of **accurate multiview shape reconstruction** of feet from images captured on a mobile phone. Work to date includes an implicit generative foot model, a large scale photorealistic synthetic dataset for training downstream tasks, and novel fitting methods.

MEng Engineering — **Downing College & Cambridge University Engineering Department**
Python | PyTorch | C++ — 2016 - 2020

Achieved a **first class** degree in Engineering, specialising in Mechanical Engineering: top 15% in Mechanics & Thermofluids in third year, top 9% and 14% in General Engineering in first and second year respectively. **Award for best mechanical project in year** in fourth year.

Experience

Student Researcher — **Google UK**
Python | Blender — Feb - Oct 2024

Worked in the synthetic data team, developing pipelines for **large scale synthetic dataset** generation for training downstream tasks for AR and VR vision applications. Contributed to Blender Python tooling for data generation.

Technical Consultant — **Snapfeet, Trya Srl**
Python | PyTorch | Swift — 2020 - Present

Research and development for **shoewear AR technologies** and **foot reconstruction algorithms**. Built novel data labelling tools, trained efficient mobile models for inference, constructed methods for size and shape estimation from multiview images, and developed mobile applications to demonstrate results. Technology used by major footwear brands, including Hugo Boss.

Founding Engineer — **UnderMyWing**
Python | Django | AWS — Sep 2023 - Dec 2023

Lead back-end content generation for a start-up producing personalized AI solutions for teachers - content generation and marking. Work involved building systems that seamlessly interact with a number of AI and computer vision tools (OCR and document identification), and a large database of content.

Research Assistant — **Cambridge University Engineering Department**
Python | PyTorch — Jun - Sep 2020

Research in the field of **non-linear parametric 3D models** for articulated rigid bodies. In particular, investigating models to tackle the shape variety seen in the animal kingdom.

Summer Student — **Cambridge Design Partnership**
Python — Jul - Sep 2018

Interdisciplinary projects, with roles including: lab testing; data analysis using specialist measurement devices and Python; testing of gas and pneumatic air systems; patent scoping; and communicating with suppliers.

Publications & Awards

FOCUS - Multi-View Foot Reconstruction from Synthetically Trained Dense Correspondences
Oliver Boyne, Roberto Cipolla - 3DV 2025

Dense correspondence prediction trained from **synthetic data**, followed by (a) matching, triangulation and surface reconstruction; or (b) optimization of a parameterized foot model to fit the dense correspondences.

FOUND: Foot Optimisation with Uncertain Normals for Surface Deformation using Synthetic Data
Oliver Boyne, Gwangbin Bae, James Charles, Roberto Cipolla - WACV 2024

Surface normal prediction trained from **synthetic data**, followed by **multiview 3D shape reconstruction** fusing multiview normals and uncertainty. Introduced *SynFoot*, a synthetic dataset of 50K foot renders.

FIND: An Unsupervised Implicit 3D Model Of Articulated Human Feet
Oliver Boyne, James Charles, Roberto Cipolla - BMVC 2022

A novel **implicit generative model of human feet**, capable of expressing shape and articulation. Built from our dataset, *Foot3D*, of high quality 3D scans of feet, which has over 120 downloads.

Who Left the Dogs Out? 3D Animal Reconstruction with Expectation Maximization in the Loop
Benjamin Biggs, Oliver Boyne, James Charles, Andrew Fitzgibbon, Roberto Cipolla - ECCV 2020

End-to-end system to recover 3D shape and pose of dogs from images. Introduced *SMBLD*, a new deformable dog model, and *StanfordExtra*, a large scale dataset of 2D dog annotations, which has over 1400 downloads.

Estimation of Canine Dynamics from Monocular Video
Oliver Boyne - 4th Year Master's Project

Method of identifying forces on dogs in motion from single-view video. Integrated state-of-the-art computer vision with computational biomechanics. Awarded the Sir George Nelson prize for **best Mechanical project in the year**.

Skills

Programming languages and tools

- Extremely proficient with Python, PyTorch.
- Proficient with Blender, Cython, Swift (Xcode), Javascript, React, AWS tools, GDScript (Godot).
- Some experience with C#, C++, GLSL.

Technical skills

- **Deep learning for computer vision** - significant experience with all parts of the deep learning pipeline: dataset generation, model selection and training, and inference (including on mobile devices).
- **Synthetic data** - experience with data acquisition using 3D scanners, data processing, and rendering using Blender. Created a Python library, **BlenderSynth**, for large scale Blender synthetic data creation.
- **Mobile development** - contributed to commercial apps, and have developed demo research apps and games.
- **Hobbyist game development** - developed **Dodo**, a PC puzzle game using Godot, with 250+ purchases on Steam.

Personal

Rowing at Cambridge — **Downing College & Cambridge University Boat Club**, 2016 - Present

Began training as a coxswain for **Downing College Boat Club** in 2016, developing invaluable team leadership and communication skills. Culminated in election to **Men's Captain** in 2018-19. Grew the squad to a size of 50, its largest in recent history, and achieved large success in competition.

In 2019, made the step up to **Cambridge University Boat Club**, and selected in three consecutive years as the coxswain for **Goldie**, the Men's reserve crew in the Boat Race against Oxford. In 2022, elected **Men's President** of the club, managing day-to-day running of the squad of 30, driving team morale, and media commitments, including BBC interviews. Led the squad to **historic clean sweep win over Oxford in 2023**. Currently training for the 170th Men's Boat Race in April 2025.

Also served as **President of the Men's Blues Committee** 2022 - 23, responsible for reviewing applications and awarding Cambridge's highest sporting honour - the Cambridge Blue.