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 — 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 — 2016 - 2020

Achieved a **first class** degree in Engineering, specialising in Mechanical Engineering. **First class** and **award for best mechanical project in year** in fourth year. **First class** (top 15%) in Mechanics & Thermofluids in third year. **First class** in General Engineering in both first year (top 9%) and second year (top 14%).

Experience

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, and constructed methods for size and shape estimation from multiview images. Technology used by major footwear brands, including Hugo Boss.

Founding Engineer — UnderMyWing
Python | Django | AWS — Sep 2023 - Present

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

Founder — CrowdStream
React | AWS | Javascript — Apr 2023 - Present

Created CrowdStream with 3 other Cambridge graduates. CrowdStream is a crowdsourced livestream app, taking advantage of readily available smartphones at local sports events to generate livestreams at scale and low cost.

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

Research in the new field of non-linear parametric 3D models for articulated rigid bodies. In particular, invesigating 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

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 50 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 1200 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 puzzle games for iOS (Swift) and cross-platform desktop (Godot).
- **Mentorship** - currently supervising two 4th year undergraduate students in computer vision projects.

Personal

Rowing at Cambridge — **Downing College & Cambridge University Boat Club**, 2016 - 2023

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**.

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.