Marwan Taher
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Education

PhD in Robotic Perception 2023 - Present
Imperial College London *London, UK*

- Advised by Andrew J. Davison at the Dyson Robotics Lab.
- Working on **implicit scene representations** for robotics.
- Developing methods leveraging **Neural Fields**, **point-trackers**, **bundle adjustment**, **feed-forward reconstruction models** (Mast3r/VGGT/π^3).

MEng Mechatronics and Robotics Engineering with a Year in Industry 2016 - 2021
The University of Sheffield *Sheffield, UK*

- Awarded **Class One Honours**.
- Masters thesis: **Long-Term Outdoor 3D Mapping**; includes working with: **factor graphs**, **MCL**, **ROS**, **C++**, **LIO-SAM**, **GTSAM** & **PCL**.
- Modules include: Control Systems, Embedded Systems, Robotics, Optimisation & Systems Engineering.

Selected Publications

Please check Google Scholar for a full up to date list of my publications.

M. Taher, E. Dexheimer, and A. Davison. "Latent Bundle Adjustment". In: Preprint. 2026

M. Taher, I. Alzugaray, K. Mazur, X. Kong, and A. J. Davison. "KV-Tracker: Real-Time Pose Tracking with Transformers". In: **CVPR** - Best Demo Award (2026)

K. Mazur, **M. Taher**, and A. Davison. "4D Primitive-Mache: Glueing Primitives for Persistent 4D Scene Reconstruction". In: **CVPR** - Oral. 2026

I. Alzugaray, **M. Taher**, and A. J. Davison. "ACE-SLAM: Scene Coordinate Regression for Real-Time SLAM". in: arXiv. 2025

M. Taher, I. Alzugaray, and A. J. Davison. "Fit-NGP: Fitting Object Models to Neural Graphics Primitives". In: **ICRA**. 2024

X. Kong, S. Liu, **M. Taher**, and A. J. Davison. "vmap: Vectorised object mapping for neural field slam". In: **CVPR** - Oral. 2023

Work Experience

Research Engineer July 2021 – Jan 2023
Dyson Robotics Lab @ Imperial College London *London, UK*

- Integrated ORB-SLAM and ARKit as tracking front-ends for different real-time mapping systems such as iMAP and **Instant-NGP**.
- Collaborated on **Reinforcement Learning** manipulation project training policies in Issac-Sim and deploying on a Franka robot arm.
- Maintained the lab servers and provided general software support.

Research Assistant in Autonomous Robotics July 2020 - June 2021
The University of Sheffield *Full-time during summer, part-time during term time - Sheffield, UK*

- Part of AdMall; a research project focusing on long-term outdoor navigation.
- Contributed to a project on a teach and repeat day-to-night navigation project using monocular vision using deep descriptors.

- Contributed to project on multi-sensor localisation using Extended Kalman Filters.
- Maintained robot's software (**ROS** & **C++**), hardware and electronics.

Design Systems Engineering Intern July 2019 – June 2020
Rolls-Royce; Civil Aerospace *Derby, UK*
- Developed python based tools to automate the engine design process, along with code **unit-tests**.
- Part of a team using **agile** software development and **version control**.

Digitalisation Summer Intern July 2018 - Sep 2018
Siemens *Manchester, UK*
- Developed Python software using **RESTful APIs**, **OOP**, and encryption protocols to automate IoT asset integration with Siemens MindSphere cloud platform.

Software and Electronics Engineer Nov 2017 - June 2018
Mobile Power UK *Part-time - Sheffield, UK*
- Designed a shield **PCB** using KiCad for power delivery and RS-485 communication.
- Developed code for interfacing an **STM32** microcontroller with a Flash Memory IC via SPI.
- Designed **3D printed** mechanical components using **SOLIDWORKS**.

Projects and Competitions

ROS2
Open-source software contributions
- Ported Grid Map to ROS2. Contributed to Navigation 2 (bug fixes and documentation).
- Work includes **C++**, **cmake**, **git workflow**, **CI** & **code reviews**.

European Rover Challenge July 2019 – June 2020
Space Robotics Competition
- Responsible for the rover navigation on a Martian-like terrain.
- Using ROS & Gazebo, developed a **3D path planning algorithm** based on A* using grid_map.

MATE ROV Nov 2016 – June 2019
Underwater Robotics Competition
- Worked across the full robot software stack, from low-level micro-controller code (C++) interfacing sensors and actuators, going through communication protocols such as UDP, all the way to writing GUIs and image processing applications (**python**).
- Electrical system development, including PCB, control and power systems design.
- Performed software and hardware debugging and problem-solving within tight time constraints.
- Mechanically designed full robots in **SOLIDWORKS** and worked on manufacturing them.
- Managed the **Mechanical**, **Electrical**, **Software** & Non-Technical sub-teams.
- Qualified and competed in the **international competition** in the USA 3 times.
- **Co-founded** the university team and held positions including **CTO** and **CEO**, awarded **MVP Engineering Presentation Award** in 2019.

Sir William Siemens Challenge February 2018
Hackathon
- The Challenge was to create a demonstration to present data collected from a building such as temperature and number of people using hardware and electronics, where we won the **1st place**.
- Worked on the electrical system, that included controlling fans, servos & RGB LED strips via an **Arduino** board along with serial communication with a **Raspberry Pi**.

Skills

- **Languages:** Python, C++
- **Frameworks:** PyTorch, NumPy, OpenCV, ROS/ROS2
- **Hardware:** PCB Design (KiCad), STM32, Arduino, Raspberry Pi, SOLIDWORKS, 3D printing

More information and other projects can be found on my website.