Marwan Taher

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Education

PhD in Robotic Perception
2023 - Present

Imperial College London

- Advised by Andrew J. Davison at the [Dyson Robotics Lab](#).
- Working on Neural Field based scene representations for manipulation.

MEng Mechatronics and Robotics Engineering with a Year in Industry
2016 - 2021

The University of Sheffield

- 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.

Work Experience

Research Engineer
July 2021 – Present

Imperial College London

- Working with Andrew J. Davison at the [Dyson Robotics Lab](#).
- Integrated ORB-SLAM and ARKit as tracking front-ends for different real-time mapping systems such as iMAP and Instant-NGP.
- Collaborating with a PhD student on a multi-task Reinforcement Learning manipulation project.
- Maintaining the lab servers and providing 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*

- 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.

Engineering Intern
July 2019 – June 2020

Rolls-Royce; Civil Aerospace

- **Design Systems Engineering Intern** (January - June)
  - ∗ 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**.
- **Manufacturing Engineering Intern** (July - December)
  - ∗ Worked on mapping out an existing Manufacturing Execution System functionality and captured **requirements** for deploying a new replacement system.

Digitalisation Summer Intern
July 2018 - Sep 2018

Siemens

- Developed a software using **Python** to connect assets to MindSphere (cloud platform) which enabled data upload and automated asset creation on MindSphere.
- Software was built using **RESTful APIs** and it involved working with symmetric and asymmetric key encryption and creation of JSON Web Tokens.
- Code used **OOP**. Used **Git** for version control.

Software and Electronics Engineer
Nov 2017 - June 2018

Mobile Power UK   *Part-time*

- 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 a **3D printed** enclosure using **SOLIDWORKS**.

Software and Electronics Intern   July 2017
Mobile Power UK
- Created a test rig for testing **LoRa**, communication protocol, by developing an Android app that communicated with a LoRa module via Bluetooth to log signal-related meta-data.

Publications

vMAP: Vectorised Object Mapping for Neural Field SLAM
Conference on Computer Vision and Pattern Recognition (CVPR), 2023

Xin Kong, Shikun Liu, **Marwan Taher** and Andrew Davison

Robust and Long-term Monocular Teach and Repeat Navigation using a Single-experience Map
International Conference on Intelligent Robots and Systems (IROS), 2021

Li Sun, **Marwan Taher**, Christopher Wild, Cheng Zhao, Filip Majer, Zhi Yan, Tomáš Krajník, Tony Prescott and Tom Duckett

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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
- Worked as a Robotics Software Engineer, responsible for the rover navigation on a Martian-like terrain.
- Using ROS & Gazebo I 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.
- Mechanical 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**.

RoboCup   2016
Robotics Competition   *Junior Rescue Category*
- Worked on the hardware side of a LEGO robot.
- Along with my team, we were awarded the **1st place** in the Egyptian finals, then competed in the **international competition** Germany.

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