
Education

- 2019 – Present **M.Eng. in Aeronautical Engineering**, *Imperial College London*, UK
Expected CGPA: First Class Honours
Selected Modules: Artificial Intelligence, Computing and Numerical Methods (1 & 2), Control Systems, High Performance Computing, Mechatronics, Optimization, Orbital Mechanics, Spacecraft Structures
- 2016 – 2019 **High School Diploma in Science & Technology**, *Grande Colégio Universal*, Portugal
CGPA: 20/20

Awards and Scholarships


- 2021, 2022 **UROP Scholarship** from the [Faculty of Engineering at Imperial College London](#)
Selective scholarships funding 12-week-long research placements (over £8,000).
- 2022 **Student and Developing Countries Travel Award** at [IROS 2022](#)
Awarded to help cover travel costs for IROS 2022 (80,000 JPY).
- 2022 **General Award** by the [Old Centralians' Trust at the City & Guilds College Association](#)
Prestigious scholarship funding travel, registration and subsistence for IROS 2022 (over £1,600).
- 2022 **Most Innovative Project Award** by Department of Aeronautics at Imperial College London
For design of path planning and thermal detection algorithms for a search-and-rescue UAV 🚁.

Research Experience



- 10/2022 – Present **Undergraduate Researcher on Assistive Robotics**
Advisors: [Prof. Yiannis Demiris](#), [Personal Robotics Lab](#), Imperial College London
[Prof. Eric Kerrigan](#), Imperial College London
- Developed an adaptive position-based impedance controller to compliantly grasp deformable objects
 - Designed handles and holders for kitchen utensils and an autonomous EOAT swapping system
 - Developed perception pipeline for autonomous obstacle detection and scene segmentation via RGBD
- 10/2021 – Present **Undergraduate Researcher on Autonomous Vehicles** 🚗
- Advisor: [Dr. Panagiotis Angeloudis](#), [Transport Systems & Logistics Lab](#), Imperial College London
- Trained >15 doctoral students on using MoCap system & robotics testbed developed in '21 UROP
 - Developed policies for differential-drive robots to safely navigate tracks with static and dynamic obstacles in simulation, zero-shot deployed control policies on testbed leading to [C2]
 - Integrating control barrier functions with MARL for provably-safe intersection crossing in mixed traffic
- Summer 2022 **Sim2Real Motion Planning for Robotic Manipulation (UROP)** 🏆
- Advisor: [Prof. Yiannis Demiris](#), [Personal Robotics Lab](#), Imperial College London
- Designed mm-accurate URDF model of a unique 41DoF mobile bimanual manipulator
 - Derived and implemented inverse-kinematics solver for closed-chain scissor lift
- Summer 2021 **Real-time Control of Autonomous Vehicle Fleet (UROP)** 🏆
- Advisor: [Dr. Panagiotis Angeloudis](#), [Transport Systems & Logistics Lab](#), Imperial College London
- Installed and integrated fleet of autonomous vehicles, MoCap system and internal network with own 🚗 simulator enabling real-time vehicle location to mm accuracy
 - Improved AVs perception of traffic signals and implemented centralized intersection controller
- Summer 2020 **Finding Novel Relationships between Material Properties (UROP)**
- Advisor: [Dr. Vito Tagarielli](#), [Department of Aeronautics](#), Imperial College London
- Developed tools for fetching and processing data from an extensive material properties database
 - Designed perceptron networks for extracting relationships between features in tabular data

Summer 2019 **Gait Analysis for the Prediction of Neurodegenerative Diseases**

Advisor: [Dr. Flora Ferreira](#), CIICESI, Porto School of Management and Technology


- Developed workflows in  for data cleaning, analysis and SVM-based classification of a gait dataset
- Raised accuracy of predicting neurodegenerative diseases from gait patterns to >80%, leading to [C1]

Publications



Key: * indicates equal contribution and shared authorship;  links to paper pdf;  links to video


Preprints

[P2] **L. Marques**, Y. Feng, and P. Angeloudis. "Safe Intersection Crossing through MARL-CBFs". *In progress. To be submitted for ITSC 2023.*

[P1] L. Parada*, E. Candela*, **L. Marques**, and P. Angeloudis. "Safe and Efficient Manoeuvring for Emergency Vehicles in Autonomous Traffic using Multi-Agent Proximal Policy Optimisation". *Transportmetrica A: Transport Science. In Review* 

Refereed Conferences

[C2] E. Candela*, L. Parada*, **L. Marques***, T. Georgescu, Y. Demiris, and P. Angeloudis. "Transferring Multi-Agent Reinforcement Learning Policies for Autonomous Driving using Sim-to-Real". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.  

[C1] **L. Marques**, F. Ferreira, A. Correia, E. Bicho, and W. Erlhagen. "Feature Extraction using Poincaré Plots for Gait Classification". *25th Portuguese Conference on Pattern Recognition (RECPAD)*, 2019, pp. 57–58. Extended abstract. 

Theses

[T1] **L. Marques**. "Towards Bimanual Food Manipulation". MEng Thesis. Imperial College London, 2023. *In Progress*

Teaching

Teaching Assistant

- Computing and Numerical Methods 1 (AERO40003), Imperial College London (Fall '22, Spring '23)

Work Experience

Imperial College London Rocketry

09/2019 – Electronics & Payload Engineer

- 03/2022
- Designed and successfully field tested circuit capable of remote parachute deployment via web interface
 - Designed and deployed technology demonstration 3U CubeSat capable of mechanical video stabilization
 - Contributed to the firmware and electrical design of the Data Acquisition and Avionics boards.

09/2020 – Safety Officer

- 10/2021
- Oversaw explosive storage, manufacturing, launches and ensured overall safety of over 80 students
 - Ensured compliance with UKRA, SARA, HSE and EUROCC guidelines

Skills

Programming Python, C++, MATLAB

Tools ROS, Git, Docker, KiCad, SolidWorks, Fusion 360, OptiTrack, Cura, Arduino, ABAQUS

Media \LaTeX , DaVinci Resolve, Kdenlive, Gimp

Certificates RSGB Foundational Radio License, [MOOC Certificates](#)

Languages Portuguese (Native), English (Fluent/CEFR C2), Spanish (Intermediate), Mandarin (Beginner)