Luís F. S. Marques
Curriculum Vitae

✉ lmarques@umich.edu
🌐 https://luismarques.dev

Education

2023 – Present **Ph.D. in Robotics**, *University of Michigan*, USA
CGPA: 4.0/4.0

2019 – 2023 **M.Eng. in Aeronautical Engineering**, *Imperial College London*, UK
CGPA: First Class Honours

2016 – 2019 **High School Diploma in Science & Technology**, *Grande Colégio Universal*, Portugal
CGPA: 20/20

Awards and Scholarships

2021, 2022 **UROP Bursary (x2)** from the Faculty of Engineering at Imperial College London
Selective bursary funding 12-week-long summer research placements (totalling over £8,000).

2022 **Student and Developing Countries Travel Award** from IROS 2022
Awarded to help cover travel costs for IROS 2022 (80,000 JPY).

2022 **General Award** from 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.

2021 **AWS Machine Learning Engineer Scholarship** from Amazon Web Services & Udacity
For high academic performance in the AWS Machine Learning Foundations course.

Research Experience

2023 – Present **Probabilistically Safe Robotic Control & Planning**
Advisor: Prof. Dmitry Berenson, Autonomous Robotic Manipulation Lab, University of Michigan
○ Researching learning and formal methods for safe control under uncertainty

10/2022 – 08/2023 **Robotic Assistive Feeding for Mobility Impaired Users**
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 – 08/2023 **Multi-Agent Reinforcement Learning for Autonomous Driving** ↗
Advisor: Prof. 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: Prof. Panagiotis Angeloudis, Transport Systems & Logistics Lab, Imperial College London
	○ Installed and integrated fleet of autonomous vehicles, MoCap system and internal network with own Python 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: Prof. 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: Prof. Flora Ferreira, CIICESI, Porto School of Management and Technology
	○ Developed workflows in R 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; 📄 pdf; ▶ video; 🖼 slides; 🌐 website; 🖻 poster.

Refereed Journals

[J1] 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*, 2023. 📄

Refereed Conferences

[C4] Y. Feng, Q. Ye, F. Adan, **L. Marques**, and P. Angeloudis. "Driving Style Classification using Deep Temporal Clustering with Enhanced Explainability". *26th IEEE International Conference on Intelligent Transportation Systems (ITSC)*, 2023. 📄

[C3] **L. Marques**, J. J. E. Macias, and P. Angeloudis. "Probabilistic Planning for Maritime Search and Rescue". *6th International Conference on Dynamics of Disasters (DOD)*, 2023. 📄 🖼

[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". *35th 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. Extended abstract. 📄 🖻

Theses

[T1] **L. Marques**. "Robotic Assistive Feeding". M.Eng. Imperial College London, 2023.

Teaching

Teaching Assistant

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

Service

Mentoring

2024 – Present	Artificial Intelligence Portfolio Project, AI4ALL - Ignite	(2 Undergraduate Students)

Institutional - University of Michigan

2024 – Present	Professional Development and Networking Chair, Robotics Graduate Student Council
2023 – Present	Graduate Student Representative, Information Technology Committee, Faculty Senate

Outreach

- *London International Youth Science Forum 2023*, presented [C3] and Imperial College's Aero facilities
- *The Great Exhibition Road Festival 2023*, showcased the Transport Systems & Logistics Lab's research

Professional Memberships

2022 – Present	Institute of Electrical and Electronics Engineers (IEEE) - Graduate Student Member
2019 – Present	Royal Aeronautical Society (RAeS) - Student Affiliate

Skills

Programming	Python, C++, MATLAB
Tools	ROS, Git, KiCad, SolidWorks, Fusion 360, OptiTrack, Cura, Arduino, ABAQUS
Media	LaTeX, DaVinci Resolve, Gimp
Licenses	Full Radio License
Certificates ↗	ESA Spacecraft Communications Training, DEIB
Languages	Portuguese (Native), English (Fluent/CEFR C2), Spanish (Intermediate), Mandarin (Beginner)