JULIA LOPEZ GOMEZ

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Second-year PhD student in Robotics and AI, part of the UKRI AI Centre for Doctoral Training in Dependable and Deployable Artificial Intelligence for Robotics (CDT-D2AIR), working on representations of reachable behaviour for long-horizon motion and manipulation planning. Supervised by Dr. Steve Tonneau, and currently a member of the MARBLE Group (Multi-Agent, Reinforcement, Behaviour and Learning) under Prof. David Abel.

EDUCATION

The University of Edinburgh and Heriot-Watt University, UK 2025 – 2029
PhD in Robotics and AI
- Thesis: Representations of Reachable Behaviour for Planning in Long-Horizon Robotics Tasks.
- Supervision: Dr. Steve Tonneau.

The University of Edinburgh, UK 2020 – 2025
MInf Informatics, First-Class Honours
- Integrated Bachelor's + Master's in Informatics.
- Activities: Lead at Endeavour Rockets, Class Rep, Academic Families Parent, Makerspace volunteer.

RESEARCH EXPERIENCE

The University of Edinburgh, UK 2023 – Present
Optimisation-Based Manipulation Planning in Convex Decompositions of C-free
- MInf thesis, continued in my PhD: a convex-optimisation manipulation planner, now on a Franka arm.
- Finds minimum-regrasp plans via MIQP and Graphs of Convex Sets, tested on bottle-cap opening.
- Implemented in Drake; applied robot kinematics, algebraic rotations and trajectory optimisation.

Heriot-Watt University, UK Sep. 2025 – Jan. 2026
Safety Evaluation of NN Control for Drone Delivery Systems
- Team project: robust training and formal verification (Vehicle + Marabou) of NN drone controllers.

LAAS-CNRS and New York University (NYU), Remote Apr. – May 2025
Monte-Carlo Tree Search for Manipulation
- Explored the use of Monte-Carlo Tree Search (MCTS) for manipulation in Gymnasium benchmarks.
- Implemented and researched the integration of RL concepts with Monte-Carlo Tree Search for discretised manipulation scenarios.
- Supervision: Dr. Nicolas Mansard (LAAS-CNRS) and Prof. Ludovic Righetti (NYU).

The University of Edinburgh, UK 2024 – 2025
Selected Machine Learning Projects
Pet image segmentation (U-Net, CLIP, Autoencoder) with an interactive UI; real-time human activity recognition from wearable sensors (Android app); occluded-sheep detection with transfer learning (Faster R-CNN, SSD).

SCHOOLS, TALKS AND EVENTS

Oct. 2026 **Rock Climbing Robots Hackathon**, Bordeaux: team of six (CDT-D2AIR, LAAS-CNRS).
Sep. 2026 **IEEE RAS Summer School on Cognitive Robotics**, Germany: research pitch.
Aug. 2026 **IPAB Workshop**, UoE: talk on convex decompositions of C-free and NLP sampling.
Feb. 2026 **ROMANDIC Winter School** on deformable object manipulation, Slovenia: poster and pitch.

TEACHING AND WORK EXPERIENCE

Teaching Assistant in Robotics – *UoE, School of Informatics* Fall 2025 & Fall 2026

- Advanced Robotics (INFR11213), MSc level: lab demonstrator, TA and marker for robot kinematics, path planning, trajectory optimisation and control.

Teaching Assistant in Robotics Design Project – *UoE, School of Informatics* Spring 2026

- System Design Project (INFR09032), UG3 level: coursework marking and office hours on robot design, machine learning and vision in embedded systems (Raspberry Pi).

Makerspace Student Technician – *School of Informatics Makerspace* Jan. 2024 – May 2025

- Volunteering and workshop delivery: 3D printing and design, Raspberry Pi, Arduino and ROS2 basics.
- Assisting Robotics undergraduates in robot-building and using makerspace resources.

Software Engineering Summer Intern – *J.P. Morgan Chase & Co., UK* Summer 2023

- Agile product development: Java, Maven, SQL, Spring Boot, Oracle Databases, react.js.

SELECTED TECHNICAL PROJECTS IN R&D

Payload Software and Electrical Lead – *Endeavour Rockets* Sep. 2022 – Sep. 2024

- Software and electronics lead for CanSat and 3U CubeSat payloads in a student-led team.
- PCB design (Altium), embedded programming (Raspberry Pi), and system integration.
- 2nd place at Mach-23 competition; invited to Airbus CubeSat Day.

Other projects: Assistive laundry-folding robot; simulated drone delivery using A* algorithm; ESA CanSat competition (microsatellite assembly, embedded sensors, PCB, CAD, 3D printing).

AWARDS

The Edinburgh Award: Makerspace Student Technician Jun. 2024
Technical project, mentoring students and delivering workshops as a Makerspace Student Technician.

The Edinburgh Award: Leadership in Student Opportunities Apr. 2023
Recognising leadership, communication, critical thinking, and digital literacy skills as UG3 Rep.

1st Prize Overall in AdaHack Hackathon: Twitter Solves Rubik's Cube Nov. 2022
Used Twitter API to gather Rubik's cube moves from the platform, showing the cube's change in 3D.

Award of Academic Excellence Jul. 2020
Top 10 in S/C de Tenerife (5,000+ students) over the last two years of high school and the EBAU.

RELEVANT SKILLS

- **Robotics:** Motion and Manipulation Planning, Graphs of Convex Sets, Convex Decompositions (IRIS), Robot Kinematics; Drake, Pinocchio, MuJoCo, ROS.
- **Machine Learning:** ML libraries (PyTorch, Tensorflow, Sklearn, wandb), Deep Neural Networks, CNNs, Reinforcement Learning, Image Segmentation (UNet, CLIP, Autoencoder architectures).
- **Programming Languages:** Python (Matplotlib, NumPy, Pandas, OpenCV), Java (Maven, Spring Boot), C/C++ (Memory Management, Linux, Embedded Programming), Haskell, SQL.
- **Mathematics:** Convex, Non-linear and Mixed-Integer Optimization; Constrained Sampling.
- **Tools & Software:** Altium (PCB Design), Fusion 360 (CAD), Git.
- **Other:** Raspberry Pi, Arduino, 3D Printing, Electronics, Circuit Design, Laser Cutting, Soldering.