

OPEN PhD POSITION

Transport Research Centre (TRANSyT) - Universidad Politécnica de Madrid (UPM)

URBAN-IA is a cutting-edge research project involving **four Spanish universities**: the Universidad de Cantabria, Universidad de Granada, Universitat Politècnica de València, and Universidad Politécnica de Madrid. The project will innovatively **develop a modular, AI-driven platform for adaptive urban mobility governance**, integrating mobility simulation, predictive optimisation, citizen participation, and equity-sensitive accessibility assessment. By embedding explainable artificial intelligence into real urban infrastructures, **URBAN-IA aims to support sustainable, inclusive, and data-driven decision-making**, advancing the transition towards more resilient and socially responsive cities.

PhD Topic: Agent-based modelling for evaluating equity issues of car restriction policies

This PhD thesis will investigate how dynamic urban mobility restrictions -such as Low Emission Zones and congestion controls- affect spatial accessibility and social equity. The research will integrate synthetic population generation, multidimensional vulnerability profiling, and accessibility analysis with an Agent-Based Model (ABM).

The proposed framework will simulate behavioural adaptation of heterogeneous individuals (e.g., low-income households, elderly populations, digitally excluded groups) under dynamic policy scenarios. By linking micro-level agent decisions to macro-level accessibility outcomes, **the thesis will evaluate distributive impacts over time and identify thresholds where policies generate disproportionate burdens**. The city of Madrid will provide the empirical focus of the research.

The results will be embedded into an AI-supported feedback system capable of adjusting restriction parameters in response to equity indicators. **The thesis advances equity-aware, adaptive urban governance** by operationalising accessibility justice within data-driven mobility systems.

The main objectives of the PhD will be:

1. To develop and calibrate an equity-sensitive ABM for dynamic mobility policies.
2. To quantify the distributive impacts of mobility restrictions on urban accessibility.
3. To integrate equity indicators into an AI-driven adaptive policy feedback framework.

As part of the training programme, the candidate will collaborate with leading Spanish and European institutions through secondments, fostering interdisciplinary exchange and broadening the impact of the thesis. In particular, a **three-month secondment will be undertaken at TU Graz, Austria**.

Supervisors



María Eugenia López-Lambas
Associated professor
of Transportation



Julio A. Soria-Lara
Professor of Urban and
Regional Planning

Required background

- MSc in Operations Research, Data Science, Transport Engineering, Mathematics, Computer Engineering, Physics, or a related field.

Required skills

- Proficiency in written and spoken English (C1 or higher).
- Medium to advanced programming skills (preferred language: Java).
- A fundamental background in machine learning.
- Self-motivation, strong organisational skills, and the ability to take personal responsibility for completing tasks.

Expected incorporation date

- May - June 2026 (negotiable)

Salary

- €24.000€ Gross annual salary with additional funding to support research secondments at international institutions.

Valuable skills

- Ability to write high-quality scientific papers (e.g., well-graded theses, publications).
- Experience with quantitative methods (e.g., agent-based modelling, multivariate statistics).
- Spanish at B2 level is preferred but not mandatory.

Other conditions

- 3 year duration
- Admission to UPM DOSIC PhD programme is mandatory

HOW TO APPLY

Please send an email to **carlos.roldan.hernandez@upm.es** the subject line "HRS2026-119 Data Scientist / Científico de datos", attaching the following documents:

(1) CV (mandatory), (2) Motivation Letter (mandatory) and (3) Recommendation Letter (optional).

More details can be found in the official website offer: <https://euraxess.ec.europa.eu/jobs/413423>

Submit your application before March 27th 2026