

What happens inside the corridor

JuPedSim
Social Force Model

The graph model on Poster 02 tells us which corridor carries the most people — not what actually happens inside it: how a queue forms at a doorway, how a jam ripples backward through a corridor, or what happens on a staircase landing that narrows from five people wide to under a metre. Answering that means simulating individual people, not counting trips.

PROCESS

Each student, an individual agent.

We use JuPedSim, a research-grade simulator built on the Social Force Model: every student is pushed toward their destination and pushed away from walls and other people, moment by moment, rather than routed once along a single path. The free-walking speed measured in Phase 1 is fed in directly as calibration parameters, so the simulated crowd moves like the one we actually measured.

Building the walkable floor.

JuPedSim needs real geometry — walls, room outlines, doors, pillars — not the abstract weighted graph from Poster 02. We built a second piece of software for this: every wall, door, and obstacle is stored only as a reference into one shared list of building points, so moving a wall never breaks the door cut into it. The structure checks its own consistency automatically and exports directly to the simulator.

One floor at a time, stitched together.

JuPedSim doesn't support multi-floor buildings natively. We run one simulation instance per floor in parallel, with custom logic that hands a student off between floors at the right staircase at the right moment, and a routing layer that plans a student's full journey across both floors before they're even injected into the simulation at their scheduled time.

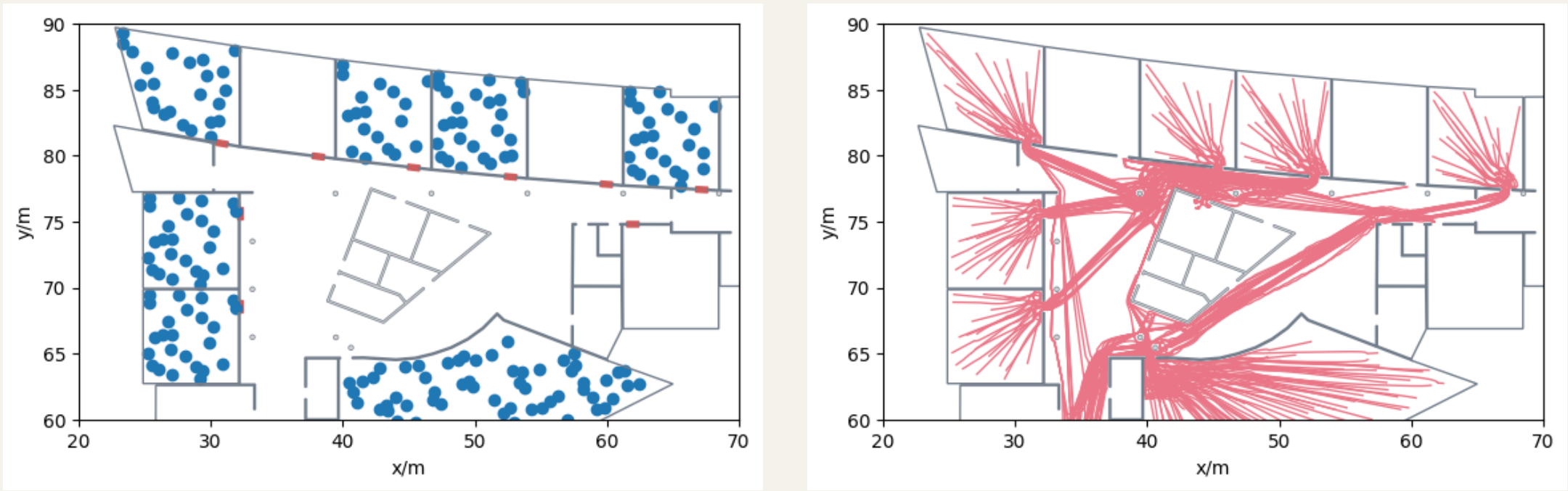
Driven by the real timetable.

At each lesson change, agents are injected at their actual source room, then routed to their actual destination — the same 52,000-trips-a-week structure from Poster 02, now played out person by person instead of counted edge by edge.

1 SCREENSHOT OF THE MAPPING SOFTWARE



2 SIMULATION SETUP & TRAJECTORIES THROUGH THE CORRIDOR



WHAT THIS IS EXPECTED TO SHOW

1 The funnel staircase's real cost.

The graph model can only say the central staircase is heavily used. This layer is where we expect to find out how long students actually queue on that 0.8 m landing, and whether a jam there backs up far enough to reach the hall behind it.

2 Local phenomena no edge-count can see.

Queue formation at a doorway, a density wave rippling back through a corridor, the physical consequence of two groups meeting head-on — none of these show up as a number on an edge, only as something that happens over time in a specific place.

STATUS

This phase is ongoing. The multi-floor parallelisation architecture, the cross-floor routing graph, and the full BIM-to-JuPedSim geometry pipeline are built and running; the building-wide congestion results are not yet in. Come to the demo desk below to see it running live on a section of the actual floor plan.

VALIDATION

From September 2026, once the building is occupied, we'll compare these predictions against real pedestrian counts. Very few studies get to validate a crowd model against ground truth in a real school — this building gives us that chance.

See it running right now ↓

Swap the 3D-printed floor plan on the screen at this desk to watch a different part of the building simulate live.