

**SAFER
ROUTE PLANNING***selfish vs. coordinated flow***Safer Route Planning for
Delivery Couriers****Problem description**

Last-mile logistics is moving off four wheels and onto two. Zero-emission-zone policies are closing city centres to vans and diesel trucks, and the freight that remains is expected to travel by cargo bike instead. This crowds the bike lanes: heavier and wider delivery bikes now share space with commuters, e-bikes, and ordinary cyclists on infrastructure that was never built for freight. Because a bike lane grows more dangerous the busier it gets, the routing choices of couriers no longer affect only themselves, they raise or lower the risk for everyone on the lane.

Route planning is one lever on that risk, but it has a catch: a navigation app sends each courier along their own fastest route, and when many couriers are guided this way they pile onto the same few good corridors and push up the risk there for all of them. This project studies the gap between couriers routing selfishly and couriers being routed to keep total risk low across the fleet and the commuters around them. This thesis will explore:

- How large the gap is between selfish routing, where each courier takes their own fastest and safest path, and coordinated routing that keeps total risk as low as possible.
- Which levers, such as route guidance, incentives, or coordinated assignment, can move couriers from the selfish pattern towards the coordinated one, and how the resulting reduction in risk is shared among couriers.

This thesis will explore these questions using real Amsterdam data, within the PROSPER research programme (TKI Dinalog) at ORBIT Lab, in partnership with Pon Holdings, Tring Tring, Gemeente Amsterdam, and AMS Institute.

Assignment

In this project you focus on:

- Modelling how couriers move through the bike network, and how the risk on a stretch grows as it gets busier.
- Comparing what happens when couriers each route for themselves with what happens when their routes are planned together, and seeing how large the difference is.
- Finding what can close that gap, whether through better guidance, small incentives, or more coordination, and who gains from it, using real Amsterdam data.

Background

The ideal candidate has an interest in networks and optimisation, and is comfortable with programming, for example Python. Some exposure to traffic assignment, network equilibrium, or game theory is a plus, along with curiosity about how delivery operators and cities interact.

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The project can be conducted as a final thesis project for MSc [TIL/TTE]. Preferred start date is as early as possible.