

## Optimizing network flow dynamics

Traffic congestion has a tremendous effect on society in terms of travelling times, fuel costs and environmental impact. As steady states are rarely observed in traffic, considering the temporal evolution of flows is crucial to describe the dynamics of network congestion adequately. However, the fields of optimization and algorithmic game theory lack fundamental knowledge on how to incorporate this critical element.

This PhD project will address this gap in academic knowledge and take necessary fundamental steps to equip practical researchers with tools to predict network dynamics. This project will encompass theoretical research in models that incorporate flow dynamics over time. It will study various practical phenomena in different models with more realistic dynamics and assumptions. Specifically, this project will assess the quality and computational tractability of dynamic equilibria and the optimal flow and develop algorithms to compute them. This will lead to a better modelling and understanding of congestion, which is necessary for and contributes to the development of tools that improve efficiency and reduce costs, travel times and environmental impact.

Questions related to this PhD project should be sent to René Sitters ([r.a.sitters@vu.nl](mailto:r.a.sitters@vu.nl)).

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