Background and motivation
To avoid parking problems in the City of Amsterdam, parking fees are high. As a consequence, many people take the risk by not paying a parking ticket, hoping there are not ‘caught’ by a (mobile) surveillance camera or a surveillance agent.

The Municipality of Amsterdam faces the problem that they have only limited resources for surveillance. At the same time, the Municipality has a lot of historical information about the locations and dates of past parking violations. This information can be used to create risk maps of where and when illegal parking takes is expected to take place in the city. This creates great opportunities for developing models that determine ‘optimal’ routes of surveillance cars, i.e. routes that optimize the effectiveness of surveillance cars.

Goal of the project
The goal of this project is to develop models and methods that determine ‘optimal’ routes for surveillance vehicles:

1. Develop models to predict the location and time of the occurrence of illegal parking on the basis of historical data (risk maps);
2. Develop a mathematical model that describes the process of parking behavior and surveillance;
3. Develop methods/algorithms for the optimization of surveillance routes;
4. Analyze the quality and efficiency of the algorithms;
5. Develop a prototype implementation of the methods.

Collaboration Municipality of Amsterdam and Centrum Wiskunde & Informatica
The internship is part of a research collaboration between the National Research Institute for Mathematics and Computer Science in the Netherlands (CWI) and the Municipality of Amsterdam. CWI is an internationally renowned research institute with many collaborations to societal parties, like companies and governments. The project is part of a bigger project between Municipality of Amsterdam, CWI, UvA, VU and TU Delft, where the focus is on predicting mobility problems caused by the introduction of the North-South metro Line (NZL) in the city of Amsterdam. You will receive an internship contract with CWI, but will also be at the Municipality on a regular basis. At the CWI there is a lot of expertise available in the area of forecasting, modeling, planning and routing.

Requirements
1. The student should have a strong background (with excellent grades) in mathematical modeling and operations research, and have an interest in working with real data;
2. The student should be comfortable with computer programming and comfortable with exploring datasets in order to analyze and model historical trends;
3. The student should be able to take initiative and work independently;
4. The student should enjoy applying mathematical knowledge to real-world practical problems.

Compensation
The student will receive an internship contract via CWI and will receive standard internship compensation per month. For more details about the assignment, please phone or mail to Prof.dr. R.D. van der Mei (mei@cwi.nl, 0613492229).