Background
Over the past years, Tata Steel has sought opportunities to come up with a robust shipping model for the Danube Region: Germany (from Regensburg into Central and Eastern Europe), Austria, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bulgaria, Romania. Tata Steel believes it is possible to supply its products in a competitive manner via a barge shuttle model into the region whereas nowadays the current mix of modalities and routings does not make it possible to distinguish itself from a logistics perspective.

More specifically, Tata Steel aims to realize the following goals:

1. Weekly departure of the barges (currently, the frequency of departures is one or two times per week);
2. Reliable transport times;
3. Competitive transport costs: Full barge departures to be gained with the help of potential co-loaders/shippers in the local area and robust backload concept;
4. Robust transfer points along the Danube river;
5. Robust alternative back-up routing to cope with incidents and capacity constraints.

Until now Tata Steel has not been successful with the implementation of the weekly barge shuttle since robust answers how to cope with the following complicating uncertainties were not yet found: (i) uncertainty in material availability due to production planning amendments: how to cope with requirements of weekly departure?, (ii) uncertain (fluctuating) water levels along the Danube: how to cope with the requirement of weekly departure and robust/competitive transport costs?, (iii) uncertain opportunities for material bundling with other shippers: optimal match so far not found, however bundling is required to achieve a weekly departure and competitive transport costs, and (iv) uncertainty related to length of the voyage and number of port calls: required to achieve reliable transport times.

For the solution many side constraints should be taken into consideration. For example, a robust link with Tata's operating procedures is required, e.g. combinations with other cargo types should always be in line with Tata policy in relation to co-loading.

Collaboration Tata Steel IJmuiden and Centrum Wiskunde & Informatica
The internship is part of a research collaboration between Tata Steel IJmuiden and the National Research Institute for Mathematics and Computer Science in the Netherlands (CWI). You will receive an internship contract with Tata Steel IJmuiden, but will also work for two days per week at CWI. You will be supervised by Maaike de Wit (Tata Steel) and Prof. Rob van der Mei and Dr. Elenna Dugundji (CWI and VU). At the CWI there is much knowledge available in the area of planning and prediction models for logistics.
Requirements
1. The student should have a background in mathematical modeling and statistical analysis.
2. The student should be comfortable with computer programming and have affinity for 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 Tata Steel IJmuiden and will receive standard internship compensation per month.

For more details about the assignment, please mail or phone to Dr. Elenna Dugundji (dugundji@cwi.nl, 0651459117)