



**Announcing:**  
**The 2018 Railroad Problem Solving Competition--**  
**Advanced analytical approaches applied to real-world rail problems**  
**First Prize: \$2000 --- Second Prize \$1000 --- Third Prize \$750**

**Predicting Near Term Train Schedule Performance and Delay**

**Description:**

Railroads have an intense level of congestion due to high volumes, long trains, and constrained track infrastructure. Often, a relatively minor event (such as a late crew or defective car that must be removed from a train) can cause a large ripple effect of delays throughout a rail network, causing delays a large number of trains. While delay is often conceptually considered on an individual train basis, a single train's delay can be the result of problems created by other trains and events in the rail network.

Passenger rail transport is an important mode of transport in the Netherlands with over a million passengers travelling by train every day. Netherlands Railways is the largest passenger train operator and operates almost 6,000 trains daily. ProRail is the infrastructure manager responsible for track maintenance and coordination of train operations for all operators.

The access and reliability of real time train data is essential for punctual and reliable train service. Several years of real time data related to delay on the entire Netherlands Railway network has been collected and made available to the operators. This data is used for passenger information systems and in dispatching centers.

**Competition Objective:**

Netherlands Railways and ProRail would like to have accurate short horizon forecasts for the rail network on an ultra-short term (say 20 minutes ahead) timescale. Currently, the most commonly used estimate for future delay is that the current delay remains unchanged. Obviously, this is often not the case. A good estimate for the delays over the next period of time will benefit both passenger information and dispatching of the railway operation.

The goal of this competition is to create better forecasts of train performance and delays. Entrants will apply any appropriate advanced analytical techniques to better predict near-term train performance.

No rail experience necessary! A detailed description of the problem is forthcoming, and questions from participants welcome! Please visit the competition website for updates and information:

<http://connect.informs.org/railway-applications/awards/problem-solving-competition>

#### **Data:**

Comprehensive data on train deviation from the planned schedule will be provided from ProRail for contestants to use advanced analytical techniques to forecast future delays, including planned and realized train timetables, planned and realized crew schedules, and planned and realized rolling stock schedules.

A sample of the time table plan and realization is available at the competition website for those interested in previewing a subset of sample data. Other more complete data sets and descriptions are forthcoming.

#### **Competition Criteria:**

The criteria that will be used to evaluate a solution include:

- The accuracy of the solution – How accurate is the predicted train performance?
- The soundness and sophistication of the solution approach – How advanced is the methodology, and how robust is its application?
- The quality of the paper describing the approach – How clear is the explanation?
- The quality of the presentation, to be given by three finalists at the Rail Application Section Meeting at the INFORMS conference in Phoenix, Sunday, November 4-Tuesday November 7. (The attendance and presentation of at least one team member required to win.)

The finalists will make a presentation at the INFORMS Annual Meeting. Aside from the previous factors, the judging panel will take into consideration the clarity of the presentation to make a final decision about the first, second and third places for the competition. Note that being among the finalists and presenting at the Annual Meeting does not guarantee a finalist will receive first, second or third place. The decision of the judges is final.

#### **Competition Awards:**

- **First Prize: \$2000**
- **Second Prize \$1000**
- **Third Prize \$750**

In addition to the cash prizes the first prize winners' contribution will also be considered for publication in the journal *Networks*. The winning team will receive an expedited refereeing and publication process.

## Eligibility

Any practitioners of operations research and management science who are interested in solving problems in the railroad domain using OR and analytics tools are welcome to participate. Registration is open to all with the exception of RAS officers and organizing committee members who are NOT eligible to participate. Likewise, members of the organizing committee may NOT help nor guide any participating team.

Teams of up to three members can participate. At least one member of each prize winning team must be available to present the team's approach and results at the INFORMS Annual Meeting.

## Registration

Participation in the contest requires registration by the due date given below. Every team must register by this due date to participate in the contest. To register, please send following information to [railwayapplicationssection@gmail.com](mailto:railwayapplicationssection@gmail.com) by the deadline. For each team member, provide the following:

- Member Names, Email, Organization, Position.
- Prior Experience in problems related to Railroad analytics (Y/N).
- Brief statement describing what motivated you to participate.

After submitting your registration email, you will receive an email confirming your team's successful registration and eligibility.

## Can I Publish?

Yes, you can. In fact, RAS encourages you to do so. Anyone can use the RAS competition problem and provided datasets in their publication. References to year-specific problem competitions are given in the URL, and as such you can reference the year-specific competition URL which will not be changed.

## Competition Calendar:

- **Registration: Deadline is April 30, 2018**  
Interested parties should register by sending an email to [railwayapplicationssection@gmail.com](mailto:railwayapplicationssection@gmail.com)  
Your email should include all team member name, contact information, and affiliation.
- **Full Problem Release: February 28, 2018**  
Additional data, more specifics of the problem
- **Question and Answer period: February 28 – July 1**  
Participants may ask questions; all questions and answers available to all participants.

- **Quiet Period: July 1 - Aug 1.**  
Participants may continue to work on solutions; no additional information provided.
- **August 1 – Solution due**  
Solution includes report on methodology, and solution data set  
(format of solution data set provided Feb 28)
- **September 1 – Finalists announced**  
Finalists are expected to give a presentation at INFORMS conference,  
Phoenix, November 4, 2018
- **November 4, 2018, Phoenix - Finalist Presentation.**  
Each finalist gives a 15-20 minute presentation on their approach;  
Judging panel asks questions.  
All finalists must attend.
- **November 4, 2018, Phoenix Winner Announced**

Sample data set and informational updates available at:

<http://connect.informs.org/railway-applications/awards/problem-solving-competition>

Watch for the full problem description on February 28!

Good luck in the competition!