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The business school that thinks and lives in the future

# Exemplifying how to bridge theory and practice

Rebecca Morris on the career of Leo Kroon

**Most of those who knew Leo Kroon considered him a quiet, unassuming man. A professor of quantitative logistics at RSM, he was known for his expertise in railways and the complex mathematical models he developed to optimise their operations. He was reticent when it came to his achievements, and his opinions. Yet his humble demeanour belied the reality of his accomplishments.**

A gifted mathematician and scientist, Professor Leo Kroon, who passed away in September, aged 57, was the world leader in timetable modelling and a scientist who exemplified how to bridge theory and practice.

'Every person in the field of timetable modelling worldwide knows the name Leo Kroon,' says RSM's René de Koster, professor of logistics and operations management, and someone who knew Kroon for 21 years. 'He was one of the brightest people I have ever known: a gifted mathematician with an exceptional mind. Leo Kroon was simply very, very good at what he did, and much of that involved solving very complex societal problems.'

At the time of his passing on 14 September 2016, Leo Kroon was the world authority on timetable modelling. During an event held by the Railroad Application Section (RAS) of INFORMS in Nashville on November 12th, (at which Joris Wagenaar became the second student of Kroon's to win a prestigious RAS award for best paper), his peers described him as 'having raised the entire field to a higher level' in terms of the quality of research, while at the same time bridging the gap between theory and practice.

## Pursuing relevance

Kroon joined RSM while the school was still in its infancy, completing his

PhD in 1990 before becoming one of the school's first faculty members. He quickly established himself as a prolific researcher. His foremost interest was in railways and he dedicated himself to the development of complex mathematical optimisation models for solving problems relating to planning and operations control. Core to the challenges he addressed was practical relevance: train scheduling and planning, rolling stock scheduling, crew scheduling and minimising travelling times for passengers who needed to switch trains. His research led to the authoring and co-authoring of over 100 papers that were published in leading journals.

Kroon's models were implemented with growing frequency by the Netherlands Railways (NS). By 1996, Kroon was employed part-time as a logistics consultant for the Department of Process Quality and Innovation at NS. He was the leading member of a team responsible for creating a model for the development of a new NS timetable, a project for which they won the prestigious INFORMS Edelman Award in 2007. This was followed in 2008 by an ERIM Impact Award. 'He basically made a model that made it possible for us to rapidly develop timetables for passenger trains all over the Netherlands, a model that has been followed in other countries,' says De Koster.

His expertise in railway timetabling attracted interest Europe-wide. In 2010, he co-ordinated the Dutch teams involved in the EU-funded research projects AMORE and ARRIVAL, which developed algorithms for optimising railway schedules and led to huge

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*René de Koster, professor of logistics and operations management, RSM*



cuts on waiting times in Germany, the Netherlands, Italy and Switzerland. More recently, he was project leader of the EUR team in the EU-funded research project ON TIME, as well as the leader of a project funded by the Netherlands Organisation for Scientific Research (NWO), "Complexity in Public Transport Project".

### Teacher and mentor

Over the course of his career, Kroon supervised a large number of PhD students. NWO subsidised many of his students, while Kroon obtained a standing contract with the Dutch Railways for the partial subsidy of all his PhD students.

Joris Wagenaar was one of his PhD students for four and a half years. 'Leo was an extremely nice, humble man,' says Wagenaar. 'It was only after seeing

people's reactions to him that I realised he was one of the big guys in the railway industry. Whenever I said I was under Leo Kroon, I was immediately one step ahead. Yet for all his success, he was always interested in my opinion and spoke to me as an equal.'

The many accolades he received are testimony to his success as a supervisor. Twice he was awarded the PhD Supervisor Award by TRAIL (the transport, infrastructure and logistics research institute). Most of his students have gone on to pursue highly successful careers within the Dutch railway sector or work at other top business schools. 'The railway research group is one of only around 100 or so worldwide and they are known for being very, very good researchers,' says De Koster. 'We can certainly look to Kroon as a contributing factor in this.'

In his own research Kroon continued to flourish. In 2011 he was awarded best paper at the World Congress on Railway Research and, in 2013, was given a "Strategic University Relationship" collaboration with IBM. Meanwhile, his network and reputation continued to grow. 'He had a constant influx of guests from all over the world coming to RSM, wanting to collaborate with him,' says De Koster.

### Excelling in everything

Kroon held himself to the highest standards, says De Koster, an attribute that was occasionally a double-edged sword: 'He often doubted himself. But he also excelled in everything he did.'

In recent years, Kroon was associate editor of the prestigious *Transportation Science* journal. Alongside other research projects, he had been chair of RSM's Examination Committee. 'Even in this he excelled,' says De Koster. 'He introduced a number of excellent changes that were very well thought out.'

De Koster has a great many memories of Kroon's qualities and achievements. But his legacy, he says, should be Kroon's approach to research. 'Kroon helped forge our reputation worldwide. But his brilliance lay in the fact that not only was he a gifted mathematician, but that he shared this gift with his students and applied it to solving important challenges in society.' ■

*Marie Schmidt will be Leo G. Kroon's successor in leading public transport research at RSM. Marie was hired by Kroon as an assistant professor and worked alongside him for four years.*