



# Braunschweiger Verkehrskolloquium

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**„Improving Traffic Flow by Local Methods“**

## **Abstract**

Traffic is one of the most important complex systems of our modern world, with several levels of complexity reaching from individual actions of a driver, over local phenomena like density fluctuations and traffic jams, regional and temporal traffic patterns, all the way up to long-range traffic development and regulation.

In recent years, tremendous progress has been made in understanding the dynamics of traffic flow and traffic congestion; however, a number of serious obstacles still prevent efficient coordination and regulation of traffic.

Three of the most serious impediments have been the incompleteness of input data, the computational intractability of forecasting the behavior of real-life traffic consisting of huge numbers of vehicles, and the lack of local communication (and thus: cooperation) between drivers.

With the advances of modern communication technologies, it has become possible to keep track of virtually all data of driving vehicles. Understanding traffic as a complex system that is based on local interaction suggests studying distributed computing approaches for controlling traffic phenomena. Finally, wireless ad-hoc networks allow real-time interaction and data exchange between adjacent vehicles.

In this talk I will describe how these tools can be used to improve the flow of congested traffic. Simulations suggest that this may allow saving about 40% of energy for cars in a traffic jam.

## **Bio**

Sándor Fekete studied mathematics and physics at the University of Cologne, before getting his Ph.D. in Combinatorics and Optimization from the University of Waterloo, Canada (1992). After spending a year as postdoc at SUNY Stony Brook, he returned to Cologne, where he got his habilitation in mathematics (1998) and joined the optimization group at TU Berlin. In 2001 he became a professor of mathematics at TU Braunschweig; since 2007 he holds a newly founded chair on algorithmics in the Computer Science Department in Braunschweig.

Sándor has published over 120 papers with more than 100 coauthors; his interests range all the way from theoretical foundations of algorithms and optimization to applications areas such as practical computer science, electrical engineering, economics, biology and physics.

