

INVITATION

# Håkan Frisinger seminar 2023

**7 November – Chalmerska Huset, Södra Hamngatan 11, Göteborg**



*Professor Lars Eriksson.*

## **The 2023 Håkan Frisinger scholarship is awarded to Lars Eriksson, professor of vehicle systems, for his significant contribution in transport research**

Håkan Frisinger's Foundation for Transport Research is awarding the 2023 scholarship to Professor Lars Eriksson at Linköping University. Lars Eriksson receives the scholarship for strong scientific merits and significant contributions to the transport industry.

Lars Eriksson is professor of vehicle systems at the Department of Systems Engineering at Linköping University. He has a long tradition of making research results easily accessible and has several collaborations with industry in general models and product-oriented research projects that resulted in various solutions used by global truck manufacturers. He is now awarded the Håkan Frisinger Award for Excellence in Transportation Research for his efforts.

Håkan Frisinger's Foundation for Transport Research is awarded annually to an outstanding researcher in the field of transport at a university or research institute with academic status in the five Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

The prize consists of an individual prize of SEK 300,000 and a period as a guest researcher at a university in Sweden, including a grant of SEK 500,000 to the university that receives the guest researcher in a Volvo Research and Education Foundation guest researcher program. It is now granted to Uppsala University, the Ånström Laboratory, which welcomes Professor Lars Eriksson's research program in electric transport.

# PROGRAM

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**Welcome to the award ceremony and seminar with this year's scholarship recipient! In addition to Lars Eriksson, you will also have the opportunity to listen to Johan Dahl and Frank Willems. The seminar is organized by Chalmers in collaboration with Volvo Research and Educational Foundations (VREF).**

Moderator: Lars Nielsen, professor Linköpings university

14:00 – 14:45	Award Ceremony
14:45 – 15:30	<b>Modeling, Models, and Control for Clean and Efficient Transportation</b> Awardee Lars Eriksson, Linköpings university
15:30 – 16:00	Coffee
16:00 – 16:30	<b>The Growing Importance of Model-Based Powertrain Control for Green Transport</b> Frank Willems, Department of Mechanical Engineering Control Systems Technology group, Eindhoven University of Technology, The Netherlands
16:30 – 17:00	<b>Advancing Sustainable and Efficient Vehicle Transports through Model-Based Approach</b> Johan Dahl, Complete Powertrain Strategies & Evolution Volvo Trucks Sweden
19.30 – 22.00	Dinner

*The seminar is free of charge and is aimed at anyone interested. Please forward the invitation to others who you think may be interested. If you have any questions about the seminar, please contact Fabienne Niklasson at [secretariat@vref.se](mailto:secretariat@vref.se).*

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## **HÅKAN FRISINGER FOUNDATION FOR TRANSPORT RESEARCH**

The purpose of the foundation is to promote scientific research and development in the field of means of transport by awarding scholarships. In 2001, the foundation established a scholarship of SEK 250,000, which is awarded annually to a researcher at a Swedish university or college. The scholarship is to promote research and development in the field of means of transport and primarily rewards efforts already made in the field.

[READ MORE ABOUT HÅKAN FRISINGER AWARD FOR EXCELLENCE IN TRANSPORTATION RESEARCH](#)

# **Lectures Håkan Frisinger Seminar 2023**

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## **Modeling, models, and control for clean and efficient transportation**

LECTURE BY THE AWARDEE, PROF. LARS ERIKSSON IN VEHICULAR SYSTEMS  
DEPARTMENT OF ELECTRICAL ENGINEERING LINKÖPING UNIVERSITY, SWEDEN



Model based development is seen as a key methodology for handling the complexity and guiding the development and optimisation of future vehicles. It can help reduce the time to market and thus increase the pace of innovation, but a cornerstone for a high innovation pace is the availability and reusability of models. In this presentation, we will follow the initiation and development of a diesel engine model that has been much used and evolved over the years to be utilised in a wide range of applications beyond the initial intentions. Starting as a model for a long haulage truck engine it has

been refitted to a passenger car, reused in a diesel electric powertrain in an off-highway application, reused as building blocks for a large marine engine model. It is the cornerstone in a benchmark problem for development of planning strategies in future connected vehicles as well as in a model for studying hybrid vehicles and how the powertrain interacts with the after-treatment system. Much of the success of the model builds on the fact that it is component based, systematically developed and adapted to a real-world engine and that it was released as an open-source model that could be freely downloadable and modified.

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## **The growing importance of model-based powertrain control for green transport**

LECTURE BY PROF.DR.IR. FRANK WILLEMS DEPARTMENT OF MECHANICAL ENGINEERING,  
CONTROL SYSTEMS TECHNOLOGY GROUP, EINDHOVEN UNIVERSITY OF TECHNOLOGY, THE  
NETHERLANDS



Powertrain control systems are the brains of the combined engine and drivetrain. These electronic control systems give the powertrain a specific feel and its characteristics, in terms of torque response, fuel consumption and emissions. Driven by societal concerns about global warming and energy security, dramatic reductions in fuel consumption and a transition towards renewable fuels are required in the upcoming decades. At the same time, increasingly strict targets for real-world pollutant emissions have to be met. This sets challenging requirements for future

powertrain control systems. Questions like the following arise. How can we guarantee minimal fuel consumption and tailpipe emissions, adapt to varying, real-world operating conditions, and still avoid increasing development time and costs? Model-based control development is key to address these questions. In this lecture, Frank Willems will illustrate its potential by successful applications for emission control and energy management. In his vision, this is an important step towards the ultimate goal: self-learning powertrains.

# Advancing Sustainable and Efficient Vehicle Transports through Model-Based Approach

LECTURE BY DR. JOHAN DAHL, EXPERT SYSTEMS ENGINEER  
COMPLETE POWERTRAIN STRATEGIES & EVOLUTION, VOLVO TRUCKS, SWEDEN



Model-based development (MBD) stands as a cornerstone in the evolution of sustainable and efficient vehicle transports, playing a key role in revolutionizing the control design and optimization processes. In the pursuit of eco-friendly mobility solutions, MBD provides a systematic and efficient development approach. By employing simulation, modeling, control techniques, MBD enables engineers to comprehensively analyze and refine complex systems, ranging from engine components to overall vehicle dynamics, in a virtual environment. This not only expedites the development timeline but also reduces the need for costly physical testing. This presentation will be focused on how MBD methodologies advancing the development of combustion engine vehicles, emphasizing MBD profound impact on efficiency, performance, and compliance with stringent environmental regulations.

Dr. Johan Dahl received the M.Sc. degree in Electrical Engineering 1999 and the Ph.D. in Automotive Control, 2004, both from Lund University. His main research interest is in modeling and control of internal combustion engines including aftertreatment and how engine and aftertreatment interacts with other systems in a vehicle to achieve sustainable and efficient transports.

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## Moderator: Lars Nielsen, Professor in Vehicular Systems

STEN GUSTAFSSON CHAIR, LINKÖPING UNIVERSITY, SWEDEN.



Lars Nielsen is one of the most cited researchers in the world within automotive control and automotive engineering, and he was the recipient of the Frisinger Award in 2014. Professor Nielsen received the M.Sc. degree in engineering physics and the Ph.D. degree in automatic control from Lund University, Lund, Sweden, in 1979 and 1985, respectively. Since 1991, he is Professor of Vehicular Systems holding the Sten Gustafsson chair at Linköping University, Linköping, Sweden. His main research interests are in automotive modeling and control, safety maneuvers, and autonomy.