

Hybrid and Electric vehicle NVH Masterclass

FEBRUARY 18-19-20 | AGENDA

SIEMENS DIGITAL INDUSTRIES SOFTWARE, INTERLEUVENLAAN 68, 3001 LEUVEN, BELGIUM

DAY 1: Tuesday February 18

As of 8:00	Registration
9:00 – 10:00	Welcome & Introduction Electrification poses a range of new challenges to development teams in terms of design and development for vehicle architecture, battery and e-motor design, energy and thermal management, aerodynamics and NVH
10:00 – 11:00	Keynote: From e-motor to integrated e-drive systems - today's experience and vision of future NVH performance Dr. Yves Burkhardt of Valeo Siemens eAutomotive
11:00 – 11:15	Coffee break
11:15 – 12:00	Electric Vehicle Sound Quality Testing and Analysis The differences between ICE vehicle and electric vehicle noise and how to use Sound Quality metrics in the context of EVs - demonstrations based on real cases
12:00 – 13:00	Lunch
13:00 – 14:00	Electric Vehicle Sound Quality Testing and Analysis – continued The differences between ICE vehicle and electric vehicle noise and how to use Sound Quality metrics in the context of EVs - demonstrations based on real cases
14:00 – 14:45	Transfer Path Analysis as a fundamental tool for NVH analysis Introduction to evaluating noise from the excitation source travels to a given receiver location
14:45 – 15:00	Coffee break
15:00 – 17:30	Transfer Path Analysis as a fundamental tool for NVH analysis The preferred TPA methodology depends on the structure, single or multi-reference sources, and the stage of the development. Here we will discuss the application to road noise, component-based TPA and demonstrate it on a wiper motor
17:45	Bus transfer to hotel
19:00	Visit brewery Den Domus
20:00	Dinner

Unrestricted

DAY 2: Wednesday February 19

- 8:00 Bus transfer from hotel to masterclass venue
- 9:00 – 10:30 **Driveline NVH aspects – Electric motor noise analysis**
- The relationship between the electrics/electronics and the generated noise
 - Electro-magnetic simulation as an input to acoustic simulation
 - E-motor noise assessment at early concept phase
- 10:30 – 10:45 Coffee break
- 10:45 – 12:30 **Driveline NVH aspects – Transmission noise**
- Addressing gear whine and rattle
 - How to increase productivity for predicting gear noise with time and frequency domain simulation models
 - Process demonstration(s)
- 12:30 – 13:30 Lunch
- 13:30 – 15:00 **System Integration – Supporting technologies**
Model-based Design (MBD) and Model-based System Testing (MBST): how to combine 1D, 3D and Testing to balance NVH with drivability and energy management
- 15:00 – 15:15 Coffee break
- 15:15 – 17:15 **Demonstration on Chassis dyno and MBST test rigs**
Visit to the Siemens engineering hall, discussions and demonstrations in small groups
- 17:30 Bus transfer to hotel
- 19:00 Dinner in Grand Café De Hoorn

DAY 3: Thursday February 20

- 8:00 Bus transfer from hotel to masterclass venue
- 9:00 – 10:30 **Flow induced noise**
How to apply acoustic testing and aero-acoustic simulation to tackle flow-induced noise such as wind noise and HVAC noise
- 10:30 – 10:45 Coffee break
- 10:45 – 12:00 **Body Engineering**
- Body/Platform Development in view of electrification and weight reduction
 - Target setting
 - Stiffness Optimization
 - Interior noise analysis
- 12:00 – 13:00 Lunch
- 13:00 – 14:00 **Acoustic Vehicle Alerting System (AVAS) to design sound quality of an electric vehicle**
- Active sound design for electric vehicle
 - Interior and exterior applications
 - Sound System Engineering
- 14:00 – 16:00 **Vehicle demonstrations / Hands-on activities on chassis dyno**
Interactive session with a fully instrumented electric vehicle on the chassis dyno
- 16:00 – 17:00 Q&A and conclusion
- 17:00 Closing
- 17:15 Transfer to railway station + Novotel Hotel