

## STS 04

# Advanced Modelling for Automotive Applications in Electric and Multi-powertrain Vehicle Design

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### Session Abstract

**Keywords:** *Automotive, modelling, machine learning, powertrain, vehicles design, simulation capabilities*

The introduction of new, greener powertrains in automotive applications has led to the need of developing new modelling tools and approaches both to the design of vehicles, which are moving towards a multi-powertrain approach, and individual components (magnetic modelling for electric motors, multilevel modelling for battery systems and cells, etc.). For electrochemical cells, in particular, improving simulation capabilities is key to catching up with current market leaders.

At the same time, approaches like machine learning, big data can deliver order of magnitude improvements in computing times and therefore time to market.

EU-funded projects working in these domains will present their advances and their future programmes.

#### **Session projects and papers:**

##### **Multiscale and Multiphysics Approach of Thermal Runaway Modelling of Li-ion Batteries for Electric Vehicle (DEMOBASE Project)**

Sara Abada, IFP Energies Nouvelles, Solaize, France

##### **An Open-Circuit Fault Diagnosis Method for Lithium-Ion Battery Packs Based on a Classification Neural Network Trained by Modelling (DEMOBASE Project)**

S. Laurent, SAFT, France

##### **Modeling Ageing of Li-ion Batteries for Automotive Applications (DEMOBASE Project)**

Dimitri L. Danilov, Eindhoven University of Technology, The Netherlands

##### **e-Component Models for Optimal Design of Electric Vehicles (OBELICS Project)**

Horst Pfluegl, AVL, Graz, Austria

##### **Comparison of Model in the Loop Simulations of a Universal Inverter with Induction Machine and Permanent Magnet Synchronous Machine Using the HIFI-ELEMENTS Standard**

Anna Isabel Ramones, RWTH Aachen University, Aachen, Germany

##### **Temperature Estimation for a Cylindrical Cell Battery Module (HIFI-ELEMENTS Project)**

S. Rath et al., TNO, The Netherlands