automotive CAE GRAND CHALLENGE

May 19 – 20, 2026
Congress Park Hanau
Germany

// ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, BIG DATA:
HOW CAN AI ACTUALLY HELP DESIGNING A VEHICLE?

// CAE PROCESS & QUALITY ASSURANCE: **AUTOMATED CAE MODEL QUALITY CHECKS FOR CERTIFICATION READINESS**

// DURABILITY / FATIGUE: **FATIGUE SIMULATION OF HV-BATTERIES (VIBRATION FATIGUE)**

// FULL VEHICLE SIMULATION:
VIRTUAL VERIFICATION AND CERTIFICATION

// OCCUPANT SAFETY:
META MODELS FOR OCCUPANT INJURY PREDICTION

// MATERIAL MODELING - FOCUS STRUCTURAL ANALYSIS:
ADVANCED MODELLING OF MATERIAL DAMAGE AND FAILURE

// OPTIMIZATION & ROBUSTNESS:
CHALLENGES OF MULTIDISCIPLINARY DESIGN OPTIMIZATION

www.carhs.de/grandchallenge

ON SITE & ONLINE

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Empowering Engineers

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Background, Concept and Implementation

In the last 40 years computer simulation has become an indispensable tool of automotive development.

Challenges in virtual vehicle development

Despite of significant progress in simulation technology and impressive results in industrial application there remains a number of challenges.

The Grand Challenge as a platform for dialog

The automotive CAE Grand Challenge stimulates the exchange between users, scientists and software developers in order to solve these challenges.

Grand Challenges 2026

The Grand Challenges 2026 have been identified through a survey among the simulation experts of the international automotive industry:

- Artificial Intelligence, Machine Learning, Big Data:
  How can AI Actually Help Designing a Vehicle?
- CAE Process & Quality Assurance:
  Automated CAE Model Quality Checks for Certification Readiness
- Durability / Fatigue:
  Fatigue Simulation of HV-batteries (Vibration Fatigue)
- Full Vehicle Simulation:
  Virtual Verification and Certification
- Material Modeling - Focus Structural Analysis:
  Advanced Modelling of Material Damage and Failure
- Occupant Safety:
  Meta Models for Occupant Injury Prediction
- Optimization & Robustness:
  Challenges of Multidisciplinary Design Optimization

Industry Requirements | Science & Research | Software Development

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In the conference one session is dedicated to each of the most critical challenges, the „Grand Challenges“.

In every session of the conference experts from industry, research and software development will explain how critical the individual challenge is for the virtual car development process and report about their efforts to overcome the challenge.

Scientific Committee

To continuously improve the concept of the conference and to ensure the up-to-dateness and industrial relevance of the topics of the yearly survey we have introduced a scientific committee in 2013.

The scientific committee is made up of renowned CAE experts from OEMs, suppliers, engineering consultants, education and research thus representing all stake holders of automotive CAE.

We are honored to introduce the members of the scientific committee:

- **Dr. Georg Eichmüller** – Volkswagen AG
- **Stephen Fisher** – Jaguar Land Rover Ltd.
- **Mark Gevers** – TECOSIM GmbH
- **Dr. Axel Hänschke** – CPS Pekka Stuckert Consulting Unternehmensberatung
- **Lutz Haese** – ZF Automotive Safety Germany GmbH
- **Prof. Dr. Lothar Harzheim** – Opel Automobile GmbH
- **Prof. Dr.-Ing. Dietmar Jennewein** - Hochschule Darmstadt
- **Stefan Kirschbichler** – Virtual Vehicle Research GmbH
- **Dr. Masahiro Okamura** – JSOL corporation
- **Bart Peeters Weem** – BMW AG
- **Dr. Dirk Rensink** – SEGULA Technologies GmbH
- **Prof. Dr. Axel Schumacher** – Bergische Universität Wuppertal
- **Alexander-Frederic Walser** – ASC-S e.V.

TUESDAY, MAY 19, 2026

09:00 Welcome and Introduction
Dr.-Ing. Dirk Ulrich - carhs.training gmbh

Parallel Sessions 09:30 – 13:00 — Brüder Grimm Saal

OPTIMIZATION & ROBUSTNESS: **CHALLENGES OF MULTIDISCIPLINARY DESIGN OPTIMIZATION**

Chair: Prof. Dr.-Ing. Axel Schumacher - University of Wuppertal

09:30 Combining traditional MDO methods with parametric and surrogate models speeds up optimisation processes, while considering the impact of manufacturing
Dr.-Ing. Hendrik Schafstall - Detroit Engineered Products

10:00 Practical Advances in Multidisciplinary Optimization: Reducing Computational Effort and Improving Solution Quality
Dr.-Ing. Jana Hahlweg - Dr. Ing. h. c. F. Porsche AG

10:30 Including NVH Requirements in MDOs: Challenges and Strategies
Dr. André Backes - TECOSIM GmbH

11:00 Coffee Break

11:30 From Structure to Flow: A Multidisciplinary and Optimization Driven Workflow Redefining What's Possible for Cast Components and Runner Systems
Sanjay Girish, Thomas Spoida - Bionic Mesh Design GmbH

12:00 Kube KAB3L – HV-Cables as an Interdisciplinary Modeling Approach
Vitali Gerbershagen, Cedric Guarino - Kube GmbH Ingenieurbüro

12:30 AI-powered Engineering: Applying Graph Databases to get a wide context for Multidisciplinary Design Optimization
Christopher Woll - GNS Systems GmbH

13:00 Lunch Break

Parallel Sessions 09:30 – 13:00 | Conference Room 1 – 4

CAE PROCESS & QA: **AUTOMATED CAE MODEL QUALITY CHECKS FOR CERTIFICATION READINESS**

Chair: Dr.-Ing. Dirk Rensink - SEGULA Technologies Germany

09:30 | CAE process for Head Impact simulation and improved structural design in HMI systems
Sebastian Schulze - AUO Mobility Solutions Germany GmbH

10:00 | Causality Analysis: Checking where it really matters
Dr. Andreas Kuhn - Andata Entwicklungstechnologie GmbH et al.

10:30 | Detecting Unknown and Unwanted Crash Behaviors: A Database-Driven Approach to Simulation Quality Assurance
Dominik Borsotto - SIDACT GmbH et al.

11:00 | Coffee Break

11:30 | Achieving Model Quality and Certification Readiness with the Oasys LS-DYNA Environment
Dr. Galal Mohamed, Shuang Gao - Arup

12:00 | Customizable Model Quality Checks for Crash-Simulations with LS-DYNA
Max Hübner - DYNAmore GmbH

12:30 | The ANSA Checks Machine: A User Focused Framework for Multi Disciplinary/Solver Model Integrity
Livia Emmanouela Baksiova - BETA CAE Systems S.A.

13:00 | Lunch Break

TUESDAY, MAY 19, 2026

Parallel Sessions 14:00 – 17:30 — Brüder Grimm Saal

MATERIAL MODELING - FOCUS STRUCTURAL ANALYSIS: **ADVANCED MODELLING OF MATERIAL DAMAGE AND FAILURE**

Chair: Mark Gevers - TECOSIM GmbH

14:00 | Material simulation: What's missing? The Volkswagen brand perspective
Dr.-Ing. Tony Porsch - Volkswagen AG

14:30 | User-Defined Plasticity and Fracture Model for Mesh-Adapted Automotive Structural Analysis
Dr.-Ing. Chongyang Zeng, Prof. Dr.-Ing. Xiangfan Fang - University of Siegen

14:55 | Hardware Validation of a Micromechanics-Based Stress State Dependent Failure Model for Ductile Steel and Aluminium Materials in ABAQUS, LS-DYNA and PAM-CRASH
Dr.-Ing. Sirus Rafiee - Waldaschaff Automotive GmbH

15:20 | Advanced Modelling of Material Damage and Failure using OpenRadioss and Radioss
Marian Bulla - Altair Engineering GmbH; Prof. Dr.-Ing. habil. Stefan Kolling - TH Mittelhessen University of Applied Sciences; Paul Du Bois - Hermes Engineering NV

15:45 | Coffee Break

16:15 | Interactions between Loading Path and Plastic Flow in Ductile Damage and Failure Modeling
Daniel Muñoz Valentin, Alberto Regidor, Javier Ferrer Revenga, Borja Garcia - newgentechs

16:40 | Material Modeling - Focus Structural Analysis: Advanced Modelling of Material Damage and Failure
Stefan Wacker - DYNAmore Gesellschaft für FEM Ingenieurdienstleistungen mbH et al.

17:05 | Experimental Calibration and Validation of Radioss Adhesive Laws for Automotive Structural Adhesives
Dr. Daniel Campos Murcia - Applus+ DatapointLabs; Brian Croop - DatapointLabs

18:15 | Bus Transfer to "Wirtshaus am See"

Evening Reception and Dinner 18:30 // Wirtshaus am See

Parallel Sessions 14:00 – 17:30 Conference Room 1 – 4

DURABILITY / FATIGUE: **FATIGUE SIMULATION HV-BATTERIES (VIBRATION FATIGUE)**

Chair: Chair: Dr.-Ing. Matthias Weinert - Ford-Werke GmbH

14:00 Industrial Requirements
Speaker tba

14:30 Advanced Mechanical Simulation of Sheet Molding Compounds: Accounting for Process-Induced Fiber Orientation
Dr. Hannes Grimm-Strele - Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM

15:00 Improving HV Battery Structural Robustness: Coupling Operational Loads with Swelling-Induced Stresses
Lucas Crombet, Dr. Simon Erker - AVL List GmbH

15:30 Coffee Break

16:00 Enhanced Simulation of Battery Durability by Improved Loads Prediction using Smart Virtual Sensing
Safak Has, Xiaoting Kou, Dr. rer. nat. Michael Hack - Siemens Industry Software GmbH

16:30 Durability of Battery Housings and Body Structures Considering Vibrations and Multiple Joint Characteristics
Helmut Dannbauer - Engineering Center Steyr GmbH & Co KG

17:00 Exhibition

18:15 Bus Transfer to “Wirtshaus am See”

Wirtshaus am See
Emmerichshofen 3
63796 Kahl am Main

Parallel Sessions 08:30 – 12:00 Brüder Grimm Saal

OCCUPANT SAFETY: **META MODELS FOR OCCUPANT INJURY PREDICTION**

Chair: Stefan Kirschbichler - VIRTUAL VEHICLE Research GmbH

08:30 Software Environment for ML - Meta Models supporting Occupant Safety Simulation
Dr. Lars Aschenbrenner, Michael Otto - Volkswagen AG

09:00 Predicting Occupant Injury Risk from Time-History Meta-Models
Patrick Obernosterer - Technische Universität Graz

09:25 Predictive and Generative Artificial Intelligence Empowering Occupant Safety and Injury Prediction
Prof. Dr. Francisco Chinesta - Arts et Métiers Institute of Technology - ENSAM

09:50 Chasing Safer Outcomes: Exploring Metamodel Capabilities for Occupant Injury Prediction in Crash Analysis
Ionut Mihnea, Dana Ionia Rat - ARRK Research & Development S.R.L.

10:15 Coffee Break

10:45 Virtual Reconstruction of Physical Crash Tests Using a Software Platform for Meta-Modeling and Design Optimization
Dr. Nicholas White - Elemance, LLC et al.

11:10 Unifying Physical Test and Simulation Data: ASAM-ODS Pipelines for AI-Driven Occupant Injury Prediction
Stefan Romainczyk - Peak Solution GmbH

11:35 Interpretable Modal-Space-Based Surrogate Models for Occupant Injury Prediction
Dr. Masahiro Okamura - JSOL Corporation

12:00 Lunch Break

Parallel Sessions 08:30 – 12:00 Conference Room 1 – 4

FULL VEHICLE SIMULATION: **VIRTUAL VERIFICATION AND CERTIFICATION**

Chair: Bart Peeters Weem - BMW AG

08:30 Requirements for CAE model and Process for Virtual Testing based Vehicle Safety Assessment
Dr.-Ing. Andre Eggers - BASt - German Federal Highway and Transport Research Institute

09:00 New generation of crash-tolerant structure - FLEXCRASH
Christian Kurzböck - VIRTUAL VEHICLE Research GmbH

09:30 Driving Simulators as a Cornerstone of Virtual Validation
Gabriele Ferrarotti - VI-grade - HBK

10:00 Coffee Break

10:30 Virtual NCAP Integration in Full Vehicle Simulation Workflows
Dr.-Ing. Sami Bilgic Istoc - IPG Automotive GmbH

11:00 Thoughts on Virtual Homologation of Crashworthiness: A Software Vendor's View
Prof. Dr.-Ing. André Haufe - DYNAmore, part of Synopsys

11:30 Animator4-based Virtual Testing and Assessment tool for comprehensive NCAP Safety evaluation
Suba Siva Chandran Kalimuthu - GNS mbH

12:00 Lunch Break

WEDNESDAY, MAY 20, 2026

13:00 – 16:35 Brüder Grimm Saal

ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, BIG DATA: **HOW CAN AI ACTUALLY HELP DESIGNING A VEHICLE?**

Chair: Dr.-Ing. Axel Hänschke - CPS Pekka Stuckert Consulting Unternehmensberatung

13:00 Industrial Requirements AI Supported Vehicle Design
Thorsten Pohl - Stellantis;
Dr.-Ing. Dirk Rensink - SEGULA Technologies Germany

13:30 AI-based Change Description and Results Exploration for Vehicle Development
Dr. Daniela Steffes-lai, Prof. Dr. Jochen Garcke - Fraunhofer-Institut für Algorithmen und Wissenschaftliches Rechnen SCAI

13:55 AI meets CAE - How Structures can be Optimized in Automated Ways
Tomoya Hayashi - Nature Architects, Inc.;
Jan Ophey - FEV Vehicle GmbH

14:20 Agentic AI for DtM: Automated Formability and Stamping Analysis
Tilman Steininger - Synera GmbH

14:45 Coffee Break

15:15 Integrating Generative AI into CAE Workflows with Simulation Data Management
Marko Thiele - SCALE GmbH et al.

15:40 Machine Learning Supported Crashworthiness Designs
Dr. Stefan Müller - SIDACT GmbH et al.

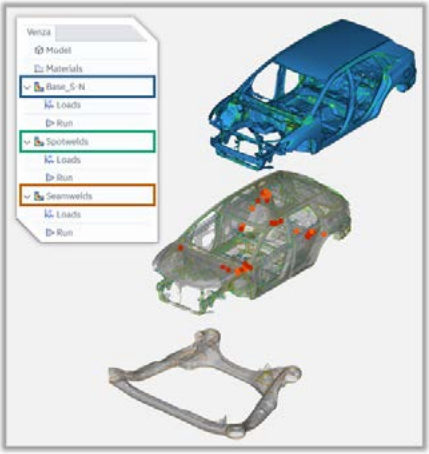
16:05 Autonomous Vehicle Design: Context, Intelligence, Action
Dr.-Ing. Moritz Frenzel - Altair Engineering GmbH

16:30 Summary and Farewell
Rainer Hoffmann - carhs gmbh

Program subject to change.

MAY 19, 2026 | 11:30 – 12:15

BETA CAE Systems Workshop



FATIQ:
A robust fatigue analysis tool for whole-vehicle applications including welded components

This demo will highlight the capabilities of FATIQ in terms of fatigue analysis for a full assembly.

First, the model set up will be demonstrated by highlighting the capabilities for fast material assignment to the components of the assembly based on advanced filtering rules.

Then, the model will be analyzed for its base material and welded locations highlighting how several analysis types can be handled under the same task.

Finally, further examples will be demonstrated, illustrating the expansion of FATIQ to further fields of application such as thermomechanical or multiaxial fatigue analysis.

BETA
SIMULATION SOLUTIONS

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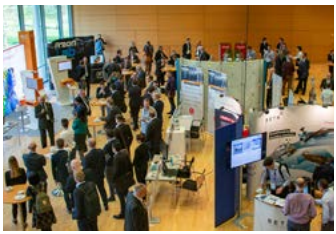

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Event Facts & Registration

Date	May 19 – 20, 2026
Location	Frankfurt/Hanau, Germany
Fee	**ON SITE:** EUR 1,190 till 21.04.2026, thereafter EUR 1,490 includes evening reception and full access to the ONLINE – Live & On demand package. **ONLINE:** Live & On Demand: EUR 1,090 includes access to the conference video stream live and on demand (up to 12 months after the event).
Discounts	Universities and public research institutes receive a 40% discount on the registration fees.
Language	English

All prices are exclusive of VAT.

- Access to conference venue including presentations and exhibition
- Networking: Coffee, refreshments & lunches during conference breaks
- Networking: Conference dinner
- Ask questions to the speakers after presentations
- Watch live stream of conference presentations (including pause/resume/skip function)
- Watch lab and demo sessions on demand (these sessions are not part of the live stream)
- Watch conference recording at any time you want and as many times as you want for at least 12 months
- Full personal access to the conference app
- Add your profile to the conference app and connect with other attendees & speakers
- Download presentations (PDF) from the conference app (depending on speakers permissions)
- Access to sponsor and exhibitor profiles on the conference app

Register for **ON SITE**

Register for **ONLINE**

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GESELLSCHAFT FÜR NUMERISCHE SIMULATION gns

Oasys LS-DYNA Environment

SCALE IT-Solutions for CAE

scapos

SIDACT GmbH

EXHIBITORS

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