automotive CAE GRAND CHALLENGE

April 16 – 17, 2019
Congress Park Hanau
Germany

Challenge Electromobility

// CAE GENERAL: AI IN CAE PROCESS AUTOMATION AND QUALITY ASSURANCE

// CRASH: MODELING OF POINT CONNECTIONS FOR MULTI-MATERIALS

// DURABILITY: INFLUENCE OF MANUFACTURING PROCESSES ON DURABILITY

// MATERIALS: MATERIAL AND FAILURE MODELS FOR METALS

// NVH: SOUND DESIGN ELECTRIC VEHICLES

// MULTI-SIMULATION: SIMULATING BATTERY AND ELECTRICAL ENGINE COOLING

// SPECIAL SESSION: VIRTUAL TESTING OF AUTONOMOUS DRIVING VEHICLES

// PARTNER WORKSHOPS: BETA CAE // ASC(S // EOMYS MANATEE

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PARTNER WORKSHOPS

CAE-based product development

In the last 30 years computer simulation has become an indispensable tool of automotive development. Tremendous progress in software and computer technology makes it possible today to assess product and process performance before physical prototypes have been built.

Challenges in virtual vehicle development

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

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. Annually the current challenges in automotive CAE are being identified through a survey among simulation experts. In the conference one session is dedicated to each of the most critical challenges, the "Grand Challenges".

Current critical challenges of automotive CAE

The Grand Challenges from the survey form the topics of the sessions of the automotive CAE Grand Challenge 2019

- ▸ **CAE General:** AI in CAE Process automation and quality assurance
- ▸ **Crash:** Modeling of point connections for multi-materials
- ▸ **Durability:** Influence of manufacturing processes on durability
- ▸ **Materials:** Material and failure models for metals
- ▸ **NVH:** Sound design electric vehicles
- ▸ **Multi-Simulation:** Simulating battery and electrical engine cooling
- ▸ **Special Session:** Virtual testing of autonomous driving vehicles

In the sessions CAE experts from industry, research and software development will explain the importance of the individual Grand Challenge for the virtual car development process and report on their efforts to overcome the challenge.

Industry Requirements ▸ Science & Research ▸ Software Development

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APRIL 16: 11:30 – 13:00 | CONFERENCE ROOM 5

BETA CAE Systems Workshop
"Bringing engineering global teams closer with NEERE: The Collaboration Hub of BETA CAE Systems"

This workshop will showcase NEERE and will walk you through its features and capabilities for streamlining your global teams' collaboration practices.

APRIL 16: 14:00 – 17:45 | CONFERENCE ROOM 5

asc(s Workshop
"Water and Liquid Management for Automotive Applications"

The simpulseday is intended to give an overview about upcoming requirements and to show latest technologies as well as best practice examples.
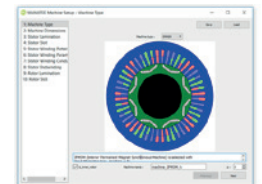

APRIL 17: 11:00 – 12:30 | CONFERENCE ROOM 5

EOMYS Manatee Workshop
"e-NVH simulation of electric motors using MANATEE software"

The workshop first presents the numerical challenges of electromagnetic Noise, Vibration, Harshness (e-NVH) simulation of electric motors, especially used in EV/HEV automotive applications.

TUESDAY, APRIL 16, 2019

09:00 h — Welcome
Dr.-Ing. Dirk Ulrich - carhs.training gmbh

Parallel Sessions — 09:30 – 13:00 h

LOCATION: BRUEDER GRIMM SAAL	LOCATION: CONFERENCE ROOM 1 – 4

MULTI-SIMULATION: SIMULATING BATTERY AND ELECTRICAL ENGINE COOLING	**SPECIALSESSION: VIRTUAL TESTING OF AUTONOMOUS DRIVING VEHICLES**

Chair: Christian Stender - Volkswagen AG

Chair: Alexander Frederic Walser - ASC-S Automotive Simulation Center Stuttgart e.V.

Industry

09:30 h — Industry Requirements – Designing a Battery-Electric Powertrain needs Predictive CAE Models
Mark Gevers - TECOSIM Technische Simulation GmbH

09:30 h — Virtual Testing of Autonomous Driving - Industrial Requirements
Dr.-Ing. Axel Hänschke - Ford-Werke GmbH

Research

10:00 h — Determination of ageing effects of Li-Ion Batteries and implications for system design
Claudius Jehle - Fraunhofer-Institut für Verkehrs- und Infrastruktursysteme IVI

10:00 h — Virtual Testing of Infrastructure Measures for Automated Road Transport
Stefan Kirschbichler, Peter Wimmer - VIRTUAL VEHICLE Research Center

Solutions

10:30 h — Rapid Estimations of Conjugate Heat Transfer – From Simplistic CFD Models to GPU-Accelerated Lattice Boltzmann Kernels
Dr. Wojciech Regulski, Bartosz Gorecki - QuickerSim

10:30 h — Simulation Driven Innovation for Autonomous Driving – From Sensor Analysis to Virtual Test Drive
Dr. Markus Schick - Altair Engineering GmbH

11:00 h — Coffee and Networking

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11:30 h — Holistic Simulation of Electrified Powertrains - Towards Closing Gaps between Different Approaches of Virtual Engineering
Christian Kehrer - Altair Engineering GmbH

11:30 h — Competing to Develop the best Autonomous Vehicles: Working together on Digital Development
Aniruddha Reddy - IPG Automotive GmbH

12:00 h — Maximizing Performance and Lifetime via Cooling Optimization of Battery HV-Path and E-Engine
Dr. Bernhard Brunnsteiner, Dr. Daniele Suzzi - AVL LIST GmbH

12:00 h — Smart Testing of Autonomous Systems
Dr. rer. nat. Michael Schlenkrich - MSC Software GmbH

12:30 h — Software-Based Optimization of E-Machine Spray Cooling Systems
Ludwig Berger - CFD Schuck Ingenieurgesellschaft mbH

12:30 h — Next steps in simulating advanced autonomous mobility
Thomas Reimer - Dassault Systemes Deutschland GmbH

13:00 h — Lunch Break

13:00 h — Lunch Break

TUESDAY, APRIL 16, 2019

	Parallel Sessions	14:00 – 17:30 h

LOCATION: BRUEDER GRIMM SAAL

MATERIALS: MATERIAL AND FAILURE MODELS FOR METALS

Chair: Achim Fellhauer - TRW Automotive Safety Systems GmbH

Industry

14:00 h — Material and Failure Models for Metals – Industry Requirements
Christian Cremer, Dr.-Ing. Robert Schilling - Ford-Werke GmbH

Research

14:30 h — Modeling of Deformation and Damage Behavior of Extruded Aluminum Profiles
Dr. Dong-Zhi Sun - Fraunhofer-Institut für Werkstoffmechanik IWM;
Dr. Florence Andrieux - Fraunhofer-Institut für Werkstoffmechanik IWM

Solutions

14:55 h — New Material Models and Failure Criteria in Altair RADIOSS
Marian Bulla - Altair Engineering GmbH

15:20 h — Coffee and Networking

15:50 h — Failure Prediction Based on Material Model MF GenYld+CrachFEM – Focus on Metals with Orthotropy of Necking and Fracture
Dr.-Ing. Helmut Gese, Prof. Harry Dell, Matthias Reißner,
Felix Brenner - MATFEM - Partnerschaft Dr. Gese & Oberhofer

16:15 h — Latest Developments in Plasticity, Damage and Failure Modelling for Metals in LS-DYNA
Dr.-Ing. David Koch, Dr.-Ing. André Haufe, Dr. Filipe Andrade -
DYNAmore GmbH - Gesellschaft für FEM Ingenieurdienstleistungen

16:40 h — VALIMAT – A Smart Solution for Generating and Managing Material Cards
Tobias Schaffranek, Artur Fertschej - 4a engineering GmbH

17:05 h — Reducing testing activities for High-Strength Steel Material Characterization devoted to Crash related design
Eduardo Martín - Applus IDIADA Group

LOCATION: CONFERENCE ROOM 1 – 4

NVH: SOUND DESIGN FOR ELECTRIC VEHICLES

Chair: Lars Eilers - GNS mbH

Industry

14:00 h — Preliminary SEA Model Development and Acoustic Package Development for EV
Pasquale Napolitano, Qingmei Chang - NIO Nextev (UK) Limited

Research

14:30 h — Virtual and experimental methods for NVH optimization – Current activities at Fraunhofer LBF
Jonathan Millitzer, Georg Stoll, Jan Hansmann, Heiko Atzrodt -
Fraunhofer-Institut für Betriebsfestigkeit und Systemzuverlässigkeit LBF

Solutions

15:00 h — Virtual Sound Design of Electric Powertrains Using MANATEE Software Combined with OROS NVH Acquisition Software
Dr. Jean Le Besnerais, Karine Degrendele - EOMYS ENGINEERING

15:30 h — Coffee and Networking

16:00 h — Optimization of Acoustic Warning Pedestrian Safety System Using Simulation
Arnaud Caillet, Massimiliano Calloni, Oussama Fatmi - ESI Group

16:30 h — NVH Optimized Vehicle Structure via Methods of DoE for the Integration of HV-Battery and E-Engin
Dr. Martin Schwab, Mehdi Mehrgou - AVL LIST GmbH

17:00 h — CAE Solutions To Overcome EV Sound Quality Barriers
Eberhard Erb - FFT Free Field Technologies;
Romain Baudson - Free Field Technologies FFT

	Evening Reception	and Dinner // 19:00 h

WEDNESDAY, APRIL 17, 2019

	Parallel Sessions	09:00 – 12:30 h

LOCATION: BRUEDER GRIMM SAAL

CRASH: MODELING OF POINT CONNECTIONS FOR MULTI-MATERIALS

Chair: Dr.-Ing. Robert Schilling - Ford-Werke GmbH

Industry

09:00 h Modeling of Multi Material Joints in Crash Simulation: State of the Art, Risks, Conditions and Opportunities
Tony Porsch, Dr. Carsten Brüggemann, Dr. Helge Liebertz - Volkswagen AG

Research

09:30 h Modelling of the Deformation and Failure Behavior of Point Connections in Multi-Materials for Crash Simulation
Dr.-Ing. Silke Sommer, Lila Schuster, Philip Rochel - Fraunhofer-Institut für Werkstoffmechanik IWM

09:55 h Virtual Testing Methodology for Bolts
Dr. Vicky Iliopoulou, Willian de Carvalho, Isabel Van de Weyenberg - Flanders Make

10:20 h Coffee and Networking

10:50 h A Nonlocal Approach for Modeling Crack Initiation at Point Connections
Dr. Thomas Heubrandtner - VIRTUAL VEHICLE Research Center et al.

Solutions

11:15 h Current Modeling Strategies for Point Connections in LS-DYNA
Dr. Filipe Andrade, Dr. Tobias Graf, Dr.-Ing. André Haufe, Guido Pietsch - DYNAmore GmbH - Gesellschaft für FEM Ingenieurdienstleistungen

11:40 h An Overview of Connector Modelling for Multi-Material Structures CAE in ESI Virtual Performance Solution
Alexandre Dumon, Alain Tramecon - ESI Group; Dr.-Ing. Sebastian Müller - ESI GmbH; Jean-Christophe Allain - ESI Group

12:05 h Multi Material Modeling with ANSA: An Application in the Automated Assembly Process in FORD
Athanasios Fokylidis - BETA CAE Systems S.A. et al.

LOCATION: CONFERENCE ROOM 1 – 4

FATIGUE: INFLUENCE OF MANUFACTURING ON DURABILITY

Chair: Dr.-Ing. Axel Hänschke - Ford-Werke GmbH

Industry

09:00 h Fatigue simulation on car body structures – current approach and future demands to consider the influence of manufacturing
Dr.-Ing. Boris Künkler - Opel Automobile GmbH

Research

09:30 h Fatigue Analysis of Additive Manufactured Components
Prof. Dr.-Ing. Udo Jung – THM University of Applied Sciences

10:00 h Integration of Manufacturing Process Simulations in the Design Loop
Prof. Dr.-Ing. Axel Schumacher - University of Wuppertal

10:30 h Coffee and Networking

11:00 h Challenges in the Fatigue Strength Analysis of Additively Manufactured Metallic Components based on Finite-Element Simulations
Kai Schnabel, Dr.-Ing. Jörg Baumgartner, Matilde Scurria - Fraunhofer-Institut für Betriebsfestigkeit und Systemzuverlässigkeit LBF

Solutions

11:30 h Efficient Subsequent Chaining of Manufacturing Steps Like Stamping and Welding for Further Durability Assessment
Dr. Oliver Goy - ESI Engineering System International GmbH; Willem van Hal, Yannick Vincent - ESI Group

12:00 h We Close the Simulation Chain from Production to Service Cycle
Klaus Hofwimmer, Wolfgang Hübsch, Axel Werkhausen - Magna Powertrain ECS Steyr GmbH & Co. KG

12:30 h Lunch Break

WEDNESDAY, APRIL 17, 2019

Plenary Session 13:30 – 17:05 h

LOCATION: BRUEDER GRIMM SAAL

CAE GENERAL: AI PROCESS AUTOMATION AND QUALITY ASSURANCE

Chair: Dr.-Ing. Dirk Rensink - :em engineering methods AG

Industry

13:30 h — Practical Challenges on the Battlefield of CAE Machine Learning
Constantin Diez - LASSO Ingenieurgesellschaft mbH

Research

14:00 h — Virtual Product Development assisted by Machine Learning
Prof. Dr. Jochen Garcke, Dr. Rodrigo Iza-Teran - Fraunhofer-Institut für Algorithmen und Wissenschaftliches Rechnen SCAI

Solutions

14:25 h — AI Applications for Crash Simulation Results
Dr. Lennart Jansen, Clemens-August Thole, Dominik Borsotto - SIDACT GmbH

14:50 h — Empowering the Application of Machine Learning Techniques through Simulation Data Management
Marko Thiele - SCALE GmbH; Akhil Pillai - TU Dresden; Prof. Dr.-Ing. habil. Uwe Reuter - Technische Universität Dresden

15:15 h — Coffee and Networking

15:45 h — Machine Learning of Crash Events Based on FEM Simulations
Dr. André Backes - TECOSIM Technische Simulation GmbH

16:10 h — Applications for AI-Based Geometry Understanding
Dr. Stefan Suwelack, Steffen Slavetinsky - Renumics GmbH

16:35 h — Machine Learning application to Rapid/Batch CAE Meshing of large complex parts
Prakash „Krish" Krishnaswamy - Xitadel Group; Umesh Mallikarjunaiah - Xitadel CAE Technologies India Pvt. Ltd.

17:00 h — Summary and Farewell
Rainer Hoffmann - carhs.training gmbh

Program subject to change.

REGISTRATION

Title	First Name
Name	
Department	
Phone	
E-Mail	
Company	
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Address	
Invoice to	
Date/Signature	

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Automotive CAE Grand Challenge 2019
The event in automotive CAE you should not miss:

► Learn all about the current challenges of automotive CAE

► The only CAE conference for which the conference topics are determined by a survey among the experts in automotive CAE

► Hear all about the efforts in research and software development to overcome the challenges of automotive CAE

► Meet researchers, software developers and industrial users during the conference, in the exhibition and at the evening reception

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EXHIBITORS

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