RESULTS OF OUR WEB-BASED SURVEY FOR THE DETERMINATION OF THE CURRENT, CRITICAL **CHALLENGES OF AUTOMOTIVE CAE**

automotive CAE GRAND CHALLENGE

April 21 – 22, 2020
Congress Park Hanau
Germany

ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, BIG DATA

100 **Evaluating** numerical and experimental **results with AI + ML**
93 AI + ML in simulation of autonomous driving
76 AI in crash simulation of batteries

BODY STIFFNESS AND STRENGTH

100 **Modeling of connections** – bolts, screws, welds
98 Failure models for adhesives
92 Strength, stiffness and failure of castings
79 Failure models structural foam

CAE PROCESS & QUALITY ASSURANCE

100 **Influence of scatter** of material, geometry and failure on **simulation results**
92 Solution run-time reduction through hard- and software
78 Impact of part manufacturing and assembly on product performance
63 Early design verification - Finite Element Analysis by designers

DURABILITY / FATIGUE

100 Fatigue of **welded connections** – spot and line welds
98 Fatigue of Aluminum Components
94 Modeling fatigue of adhesives
86 Thermo mechanics - loading and material

FULL VEHICLE SIMULATION

100 Modeling of **sensors for automated driving**
91 Model build and data handling with PLM Systems
90 MBSE Model-based system engineering
89 Model extensions to support ADAS simulation

MATERIAL MODELING – FOCUS CRASH ANALYSIS

100 **Material characterization** and modeling **3d printed parts**
95 Failure EPP foams under compression in crash
94 Modeling failure of airbag fabric - airbag burst
93 Modeling sandwich foam materials

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MODELING ISSUES CRASH ANALYSIS

100	**Modeling wheels** and suspensions for **small overlap test**
99	Gluing - different adhesives and related modeling issues
95	Modeling of line welds
92	Modeling electrical drives in crash (engine, gear box)

MULTI SIMULATION

100	**Multi scale models** for predicting **fracture**
98	Holistic simulation electrical engines - electric, mechanical, thermal
90	Thermal influences on performance of electrical engines
87	Thermal management and comfort future vehicles

NOISE, VIBRATION, HARSHNESS

100	Prediction **accuracy** of acoustic simulations
95	Analysis of high frequency cabin noise
81	Prediction of rolling tire noise
77	Simulation of ventilation system noise in electric vehicles

OCCUPANT SAFETY

100	**HBMs** for occupant safety of **autonomous vehicles**
87	Reduced Order Modeling and Response surface-based restraint system optimization
82	Computing input signals for crash sensors with FEM/MATLAB coupling
80	Airbag modeling issues - unfolding, contacts, gas flow

OPTIMIZATION & ROBUSTNESS

100	**Reduced Order Modeling** for fast optimization
96	Use of heuristic/expert knowledge in optimization
95	Shape and topology optimization for MPDB crash
72	1d solvers for crash simulation and optimization

VIRTUAL MANUFACTURING

100	**Simulation** and optimization of **3d printing** processes
98	Welding simulation and distortion prediction
93	One step solvers for sheet metal forming
91	Simplified casting simulation

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