Conference Agenda

12th EUROPEAN LS-DYNA CONFERENCE

14 - 16 May 2019 – Koblenz, Germany
Dear LS-DYNA user,

We would like to cordially welcome you to the 12th European LS-DYNA Conference in Koblenz, Germany.

Also this year our sessions run 8 times parallel. We owe this to nearly 200 submitted presentations and 8 workshops, which reflect the high popularity of LS-DYNA and LS-OPT. In addition to the wide range of topics covered by the technical presentations, we are particularly pleased this year about the large number of keynote presentations by renowned speakers from all over the world. We have scheduled an additional keynote session on Wednesday and hope that the presentations will arouse your interest.

Besides the presentations also the mutual professional exchange with other users enjoys a high value. There will be room for stimulating discussions on Tuesday evening at our get-together in the exhibition. In addition to musical accompaniment, you can win an attractive prize at our racecourse.

On Wednesday evening, the official conference gala dinner will take place in the Great Hall. You will have the opportunity to enjoy an entertaining programme, exchange professional ideas and make new contacts in a relaxed atmosphere.

We would like to take this opportunity to express our special thanks to our sponsors. Without their commitment it would hardly be possible to organize an event of this size.

We hope that you enjoy the 12th European LS-DYNA Conference and wish you a pleasant stay.

Sincerely yours

SPONSORS
**Tuesday, 14 May**

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<th>Time</th>
<th>Room A</th>
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<tr>
<td>12:45</td>
<td><strong>Welcome/Keynote Presentations</strong></td>
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<td>15:15</td>
<td>Vehicle Development I</td>
<td>Dummy Models</td>
<td>Optimization I</td>
<td>Forming I</td>
<td>Thermoplastic Materials I</td>
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<tr>
<td>17:05</td>
<td>Vehicle Development II</td>
<td>Human Models</td>
<td>Metallic Materials I</td>
<td>Forming II</td>
<td>Aerospace</td>
<td>Thermoplastic Materials II</td>
<td>Sim. Data Management I</td>
<td>Workshop Oasys</td>
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<td>19:30</td>
<td>Get together: Food, drinks and live music in the exhibition hall</td>
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**Wednesday, 15 May**

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<tr>
<td>06:45</td>
<td>Running LS-DYNA (45 min. jogging)</td>
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<tr>
<td>09:40</td>
<td>Model Reduc. &amp; Analysis</td>
<td>Airbags</td>
<td>Particle Method</td>
<td>Spotweld &amp; Thermal I</td>
<td>High Speed Impact II</td>
<td>Fiber Rein. Polymers I</td>
<td>LS-DYNA on Demand</td>
<td>Workshop BetaCAE</td>
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<td>11:20</td>
<td>Plenary P</td>
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<td>17:25</td>
<td>Electric Vehicle II</td>
<td>Manufacturing I</td>
<td>WS: Phase Transformation</td>
<td>Isogeometric II</td>
<td>High Speed Impact IV</td>
<td>Wood &amp; Foams</td>
<td>HPC II</td>
<td>Workshop SDM</td>
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<td>19:00</td>
<td>Reception in the exhibition hall</td>
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<td>20:00</td>
<td>Gala dinner in Plenary P</td>
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**Thursday, 16 May**

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<tr>
<td>08:30</td>
<td>Connections</td>
<td>Manufacturing II</td>
<td>Metallic Materials II</td>
<td>Optimization II</td>
<td>High Speed Impact V</td>
<td>Fiber Rein. Polymers III</td>
<td>Civil Engineering</td>
<td>Workshop GISSMO</td>
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<tr>
<td>10:40</td>
<td>Adhesive/ Rivets</td>
<td>Thermal II</td>
<td>Material Character. II</td>
<td>Optimization III</td>
<td>High Speed Impact VI</td>
<td>Fiber Rein. Polymers IV</td>
<td>Implicit</td>
<td>Workshop LS-FORM</td>
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<td>15:45</td>
<td>End of conference</td>
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AGENDA – TUESDAY, 14 MAY 2019

Plenary P

WELCOME – KEYNOTE PRESENTATIONS

12:45 Welcome
U. Franz (DYNAmore)

13:00 Recent Developments in LS-DYNA – Part I
J. Wang (LS TC)

13:30 In Expectation of Reduced Model for Car Crash Simulation
T. Yasuki (Toyota)

14:00 Safety CAE for Real World Occupant Protection

14:30 Sponsor Presentation: Fujitsu/Intel

14:45 Break

Room A

VEHICLE DEVELOPMENT I

15:15 A Study on Shell Element Sensitivity and Shell to Solid Modeling Transition
J. He (Forming Simulation Technology), P. Du Bois (Consultant)

Room B

DUMMY MODELS

15:15 Sled Tests and Simulation Results with Q10 Update Kit Euro NCAP 2020
H. Ipek (Daimler)

Room C

OPTIMIZATION I

15:40 Development of Carbon Fibre Floor Structure for Premium Electric SUV
P. Bristo (NIQ)

16:05 Roof-Crush Analysis of the Volvo XC40 using the Implicit Solver in LS-DYNA
A. Jonsson (DYNAmore Nordic), M. Carlberg (AP/Volvo Cars Consultant), T. Eriksson (Volvo Cars)

Room D

FORMING I

15:40 Q10 Euro NCAP 2020 LS-DYNA Model Development
B. Been, K. Waagmeester, M. Burleigh, A. Lakshminarayana (Humanetics Europe), R. Jagadish (Humanetics)

16:05 Crash Test Dummies for Automated Vehicle Development
I. Maatouki, C. Klessen, Z. Zhou, J. Wang (Humanetics)

16:30 Break

Room A

VEHICLE DEVELOPMENT II

17:05 Crash Simulation of Cast Iron Alloys with Nodular Graphite using Different Material Models
D.-Z. Sun, F. Andrieux (Fraunhofer IWM)

17:30 A Comparative Study of the Hexahedral Elements in LS-DYNA for Crashworthiness Simulation
S. E. Hogue, S. Scheibholzer, S. Ucsnik (LKR Leichemekallcentrum Ranshofen)

17:55 Application of Vehicle Impact Simulation to Protective Barrier
D. Aggromito, J. Farley, M. Walden (Consultant)

Room B

HUMAN MODELS & MATH. MODELS

17:05 Multi Objective Optimization Approach for Biomedical Stent using Parametric Optimization
M. Saulin (DynaS+), P. Balu (DEP)

17:30 Musculoskeletal System Simulation in LS-DYNA using Continuum-Mechanical Approach
O. Aari (Fraunhofer IPA); Prof. O. Röhste (University of Stuttgart)

Room C

METALLIC MATERIALS I

17:05 Calibration and Application of GISSMO and *MAT_258 for Shell Element Simulations of High-Strength Steel
J. Johnsen, J. K. Holmen, D. Morin, M. Langseth (NTNU)

17:30 The Effect of Element Formulation on Simulations of High-Strength Steel
M. Schill, J. Biskof (University of Stuttgart)

Room D

FORMING II

17:05 A Hosford-Based Orthotropic Plasticity Model in LS-DYNA
F. Andrade (DYNAmore); T. Borrvall (DYNAmore Nordic), P. Du Bois (Consultant), M. Feucht (Daimler)

17:30 Shell Models with Enhanced Kinematics for Finite Elements in Sheet Metal Forming Simulations
J. Willmann, M. Bischoff (University of Stuttgart)

18:20 On the Setup and Simulation of Large Scale LEGO Models Build with LS-DYNA and LoCo
T. Gerlinger, D. Koch, A. Haufe (DYNAmore), N. Karajan (DYNAmore Ohio), M. Thiele, A. Sahurnean (SCALE)

18:45 FE Approach to Evaluate the Dynamic Friction Coefficient for the Transient Phase of Rubber-Ice Sliding Interaction
A. Scattina, (Politecnico di Torino); R. Leonardi, S. Scaler (DYNAmore Italia)

18:20 Research Regarding the Mathematical Modelling of Cyclist Rear Collisions
O. A. Cordova (Transilvania University)

18:45 Effect of Side Incubator Padding on Unrestrained Child Crash Dummy under Deceleration Force
A. Rabiee (Cranfield University)

19:10 End of presentations

GET TOGETHER – FOOD, DRINKS AND LIVE MUSIC IN THE EXHIBITION HALL
AGENDA – TUESDAY, 14 MAY 2019

ROOM F

AEROSPACE

Undamped Extension of a Nose Landing Gear H. Frey (Liebherr Aerospace); W. Lietz, U. Stelzmann (Cadfem)

Methodological Approach to the Modelling of Tire/Ground Interaction A. Al-Tayawe, H. Abhyankar, J. Brighton, V. Marchante-Rodriguez, G. Gent (Cranfield University)

ROOM G

THERMOPLASTIC MATERIALS I
Approach for Modelling Thermoplastic Generative Designed Parts F. Althammer (Daimler/University of Stuttgart); D. Moncayo (Daimler); Prof. P. Middendorf (University of Stuttgart)

A New Modelling for Damage Initiation and Propagation of Randomly-Oriented Thermoplastic Composites K. Saito, M. Nishi (JSOL); S. Hayashi, M. Kan (Honda R&D)

A Viscoelastic-Viscoplastic Time-Temperature Equivalence for Thermoplastics V. Dorléans, E. Michau (Faurecia Interior System); R. Delilie, F. Lauro, D. Notta-Cuvier, B. Bourel, G. Haugue, H. Mervan (University Polytechnique Hauts de France)

ROOM E

THERMOPLASTIC MATERIALS II
Strength Assessment of an Electronic Plastic Component considering Local Fiber Orientation and Weld Lines N. Schafet, M. Kuczynska (Robert Bosch); S. Pazour, W. Korte, M. Stojek (PART Engineering)

Failure Prediction for Polymer Products with Short Fiber J. Takahashi, Y. Fujita (Asahi Kasel)

Modelling of Polypropylene Subjected to Impact Loading at Low Temperatures E. Schwenke (NTNU)

SIMULATION DATA MANAGEMENT I
Implementation of a Method for the Generation of Representative Models of Polycrystalline Microstructures in LS-PrePost S. Falco (Imperial College London); N. Bombace, N. Petrinic (University of Oxford); P. Brown (DSTL)

Automated Evaluation and Reporting of Simulation and Test Result Data integrated with CAE Process Workflow A. Kumar, G. Geißler (SCALE)


Batch Meshing of Complex CAE Parts using Machine Learning P. Krishnaswamy, U. Mallikarjuniah (Xitadel)

ROOM H

WORKSHOP
Oasys PRIMER Workshop – Introduction and Demonstration of Automotive Tools G. Newland (Arup/Oasys)

Oasys PRIMER is used worldwide to pre-process LS-DYNA models. As well as the core tools for model creation and checking, PRIMER contains many tools to make it easier to setup automotive models/loadcases. This workshop will introduce these tools and demonstrate how to use them. Examples include:

- Barrier positioning.
- Pedestrian protection.
- Interior head impact.
- Seatbelt anchorage.
- Occupant setup.
- Automation.

Members of the Oasys team will also be on hand to answer any questions you have on PRIMER or any of the Oasys LS-DYNA products.

GET TOGETHER – FOOD, DRINKS AND LIVE MUSIC IN THE EXHIBITION HALL
AGENDA – WEDNESDAY, 15 MAY 2019

06:45  Running LS-DYNA (45 min jogging)

MORNING SESSIONS

<table>
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<tr>
<th>Room A</th>
<th>RAILWAY AND COMMERCIAL VEHICLE</th>
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| 08:05  | Virtual Testing of Curved Vehicle Restraint Systems
        | B. Fröhlich (Bundesanstalt für Straßenwesen) |

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<th>Room B</th>
<th>RESTRAINT SYSTEM</th>
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| 08:30  | Vehicle Restraint System Optimization and Robustness Assessment using the Coupling between LS-DYNA, LS-OPT and DEP MeshWorks Software
        | M. Köhl (thyssenkrupp Packaging Steel) |

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<tr>
<th>Room C</th>
<th>FLUID-STRUCTURE INTERACTION</th>
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| 08:55  | Parachute Deployment Simulations using LS-DYNA ICFD Solver and Strong FSI Coupling
        | M. Le Garrec, A. Poncel, V. Lapoujade (DynaS+) |

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<th>Room D</th>
<th>FORMING III</th>
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| 09:20  | Springback in Assembly of Mirror Panels with Stamped Supports for Concentrating Solar Power Applications
        | J. Pottas, J. Coventry (The Australian National University) |

09:20  Break

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<tr>
<th>Room C</th>
<th>MODEL REDUCTION &amp; ANALYSIS</th>
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| 09:40  | Increasing CAE Productivity – Airbag Model Verification using Visual-Environment
        | A. Lerch, N. Mire (ESI Automotive); M. Seshadri, A. Gittens, M. Sommer (ESI) |

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<tr>
<th>Room B</th>
<th>AIRBAGS</th>
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| 10:05  | Airbag Folding for LS-DYNA using Generator4
        | L. Benito Cia (GNS) |

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<th>Room A</th>
<th>PARTICLE METHOD</th>
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| 10:20  | Numerical Simulations of Vacuum Packed Particles using LS-DYNA
        | P. Bartkowski, R. Zaletewicz (Warsaw University of Technology) |

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<th>Room D</th>
<th>SPOTWELD &amp; THERMAL I</th>
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| 10:40  | Recent LS-DYNA Developments in the Structural Conjugate Heat Transfer Solver
        | T. Klöppel (DYNAmore) |

10:55  Break

Plenary P

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<th>Room D</th>
<th>KEYNOTE PRESENTATIONS</th>
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| 11:20  | A Fly Landed on my Bumper and my Results Changed?
        | K. Pydimarry (Honda R&D); A. Gromer (DYNAmore Ohio) |

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| 11:50  | Towards a Virtual Laboratory for Aluminium Structures
        | Prof. O. S. Hopperstad (NTNU) |

12:20  Lunch Break
**AGENDA – WEDNESDAY, 15 MAY 2019**

**Room F**
- HIGH SPEED IMPACT I
  - Determination of Impact Loads for a Tracked Military Vehicle during a Crash Scenario
    - B. Balaban (FNSS Savunma Sistemleri)
  - Armor Steel Impacted by Projectiles with Different Nose Shapes – Numerical Modelling
    - T. Fras, N. Faderl, L. Blanc (ISL); C. C. Roth, D. Mohr (ETH Zurich)

**Room G**
- THERMOPLASTIC MATERIALS III
  - Failure Modeling of Unreinforced and Fiberreinforced Thermoplastics
    - P. Reithofer, B. Hirschmann, T. Schaffranek (4a engineering)
  - Constitutive Model of Filled Elastomers Capable of Capturing Multis Effect, Hysteresis, Induced Anisotropy and Permanent Set – Part I: Model Theory & Implementation
    - R. Chandrasekaran, M. Hillgärter, M. Itskov (RWTH Aachen University); M. Müller, F. Burbulla (Dr. Ing. h.c. F. Porsche)
  - Cont.: – Part II: Experiments & Validation
    - M. Hillgärter, R. Chandrasekaran, M. Itskov (RWTH Aachen University); M. Müller, F. Burbulla (Dr. Ing. h.c. F. Porsche)

**Room E**
- SIMULATION DATA MANAGEMENT II
  - Postprocessing of the 2020 EU-NCAP Frontal Impact Test in META
    - N. Tzolas, D. Siskos (BETA CAE Systems)
  - Animator4: Extended Representation of LS-DYNA Properties in Postprocessing
    - C. Kaulich, S. Hanson (GNS)
  - Multi Material Modeling with ANSA: An Application in the Automated Assembly Process in FORD
    - T. Fokylidis, V. Karatsis (BETA CAE Systems); U. Tunc, H. Wuestner (Ford-Werke); N. Pasligh (Ford Forschungszentrum Aachen); C. Ping, M. Ng (Ford Australia)

**Room H**
- WORKSHOP
  - Material Parameter Identification with LS-OPT
    - K. Witowski (DYNAmore)
  - In this workshop a short introduction to LS-OPT will be given, and the application of LS-OPT for calibration of material parameters will be presented.
    - The new LS-OPT version 6.0 features for the usage of digital image correlation data for calibration of material parameters will be discussed by means of an application example.

**Room I**
- HIGH SPEED IMPACT II
  - Simulation of Concurrent Detonation of Multiple High Explosive Charges
    - L. Schwer (Schwer Engineering & Consulting Services); S. Sjobko, H. Bornstein (Defence Science and Technology Group)
  - Blast Detonated by Impact Simulation
    - M. Büyük (Sabanci University); H. Balaban, U. Penekli (FE-Tech)
  - Mesh Sensitivity of Blast Wave Propagation using 2D to 3D Mapping
    - D. A. Powell, D. Bogosian (Baker Engineering and Risk Consultants); L. Schwer (Schwer Engineering & Consulting Services)

**Room J**
- FIBER REINFORCED POLYMERS I
  - Simulation Software Transversal Development of a TP Based Fiber Reinforced Composite Material Law
    - B. Eck (Faurecia Clean Mobility); J. Lacambre (DYNAmore France); Prof. P. Rozycki (Ecole Centrale de Nantes); M. Mbacke, T. Peret (IRT Jules Verne)
  - Design and Material Characterization of Reinforced Plastics for Secondary Structural Load Paths in an Early Development Phase
    - D. Moncayo (Daimler); M. Cyperling (Mercedes-Benz Werk); G. Dumitrutu, T. Graf (DYNAmore); D. Coutelier, H. Naceur (Université Polytechnique Hauts-de-France)

**Room K**
- LS-DYNA ON DEMAND
  - LS-DYNA on Demand License
    - U. Göhner (DYNAmore)
  - Leveraging Rescale’s Cloud HPC Simulation Platform to Run LS-DYNA Models and Accelerate Design Exploration: Examples and Case Studies
    - F. Treheux (Rescale)

**Room L**
- WORKSHOP
  - ANSA and META: Crash and Safety at its Best
    - ANSA and META offer a complete suite for Crash and Safety applications. Seats are moved easily to the desired position and dummies are positioned on them, achieving a penetration free and restrained, by seatbelts, system. Occupant Injury criteria for simulation and laboratory tests can be easily evaluated in META. Pedestrian analysts have at their disposal a complete tool for marking, bulk positioning and load case creation for all desired targets and post processing capabilities for the evaluation of the corresponding results. All interior safety regulations available in the market are applicable in ANSA and META through automated tools for the safety of the driver and passengers.

Program subject to alterations. * Subject to final approval.
AGENDA – WEDNESDAY, 15 MAY 2019

AFTERNOON SESSIONS

Plenary P

KEYNOTE PRESENTATIONS

13:40
Machine Learning as a Tool for Engineers
S. Peters (Daimler)

14:10
Virtual Vehicle Development at NIO
N. Brännberg (NIO)

14:40
Challenges in Occupant CAE: From Sled Test Simulation to Full Vehicle Crash
R. Tejero de la Piedra (Opel Automobile)

15:10 Break

Room A

ELECTRIC VEHICLE I

15:40
Numerical Modeling and Prognosis of the Dynamic Response of High Voltage Components in Electric Cars
M. S. Ridene (Daimler)

16:05
Lithium-Ion Battery Models and Thermal Management in LS-DYNA
K.-S. Im, Z.-C. Zhang, G. Cook Jr. (LSTC)

16:30
BatMac: A Battery Macro Model to Simulate a Full Battery in an Electric or Hybrid Car Crash
P. L’Eplattenier, I. Caldichoury (LSTC)

16:55 Break

Room B

IMPACTORS/BARRIERS

15:40
The 3rd Generation Crash Barrier Modeling Method and Application on MDPB
Y. Wang (VAYU-TECH)

16:05
Development of Pedestrian Headform Finite Element (FE) Model using LS-DYNA and its Validation as per AIS 100/STR 9
N. A. Kulkarni, S. R. Deshpande, R. S. Mahajan (The Automotive Research Association of India)

Room C

MATERIAL CHARACTERIZATION I

15:40
Development of a New Method for Strain Field Optimized Material Characterization
M. Bentz, J. Inslinger, M. Feuchter (Daimler), P. Du Bois (Consultant), M. Bischoff (University of Stuttgart)

16:05
Efficient Characteristic Identification of Plastic Materials for Crash Analysis with 3-Point Bending Machine
O. Ito, Y. Nakagawa, K. Kaneda, N. Matsuura, Y. Ueda (Honda R&D)

Room D

ISOGEOMETRIC I

15:40
Enabling the Analysis of Topologically Connected Multi-Patch Trimmed NURBS Shells in LS-DYNA
S. Hartmann (DYNAmore), L. Leidinger (BMW), L. Li, A. Nagy, M. Pigazzini, D. Benson (LSTC)

16:05
Explicit Isogeometric B-Rep Analysis on Trimmed NURBS-Based Multi-Patch CAD Models in LS-DYNA
L. Leidinger (BMW)

Room E

ISOGEOMETRIC II

15:40
Isogeometric Analysis using the *IGA_INCLUDE_BEZIER Keyword in LS-DYNA
M. Sederberg (Coreform), M. Scott (Brigham Young University/Coreform)

16:05
Comparative Evaluation of Isogeometric Analysis and Classical FEM with regard to Contact Analysis
Z. Naveed, A. Kühhorn, M. Kober (BITU Cottbus-Senftenberg)

ELECTRIC VEHICLE II

17:25
Measurement of Electromagnetic Launcher Muzzle Velocity with Induced Voltage of B-Dot Probe
H.-K. Kim, M.-A. Woo, J. Kim (Pusan National University)

17:50
Battery Cooling Simulation using STAR-CCM+
D. Grimmeisen, M. S. Schneider (Cascate)

MANUFACTURING I

17:25
Impact Analysis of Polymeric Additive Manufactured Lattice Structures
G. Laird (Predictive Engineering), P. Du Bois (Consultant)

17:50
Development of a Process Simulation Model of a Pultrusion Line
M. Duhr, P. Aswale, D. Schommer, J. Hausmann (Institut für Verbundwerkstoffe)

WORKSHOP

17:40
Phase Transformation of Metallic Materials
M. Merten, T. Klöppel (DYNAmore)

17:50
Several phase change models in LS-DYNA provide the possibility to numerically predict the distribution of process dependent material properties. The workshop gives a brief overview on existing models and discusses the recently developed material *MAT_254 in some detail. Possible approaches to calibrate this complex material model based on given experimental results are shown. In a first example, an isothermal TTT-Diagram is used to define a material card for the press hardening steel 22MnB5. A second show case demonstrates the potential application of the material model to the bake hardening effect of 6xxx aluminium alloys.

18:15
Coupling of a Foaming Process and Material Modeling with LS-DYNA
T. Schäfer, C. Hinse (SimpaTec)

18:40 End of presentations

19:00 RECEPTION IN THE EXHIBITION HALL

20:00 GALA DINNER IN PLENARY ROOM

KEYNOTE PRESENTATIONS

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S. Peters (Daimler)

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N. Brännberg (NIO)

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15:10 Break

Room A

ELECTRIC VEHICLE I

Numerical Modeling and Prognosis of the Dynamic Response of High Voltage Components in Electric Cars
M. S. Ridene (Daimler)

Lithium-Ion Battery Models and Thermal Management in LS-DYNA
K.-S. Im, Z.-C. Zhang, G. Cook Jr. (LSTC)

BatMac: A Battery Macro Model to Simulate a Full Battery in an Electric or Hybrid Car Crash
P. L’Eplattenier, I. Caldichoury (LSTC)

16:55 Break

Room B

IMPACTORS/BARRIERS

The 3rd Generation Crash Barrier Modeling Method and Application on MDPB
Y. Wang (VAYU-TECH)

Development of Pedestrian Headform Finite Element (FE) Model using LS-DYNA and its Validation as per AIS 100/STR 9
N. A. Kulkarni, S. R. Deshpande, R. S. Mahajan (The Automotive Research Association of India)

Room C

MATERIAL CHARACTERIZATION I

Development of a New Method for Strain Field Optimized Material Characterization
M. Bentz, J. Inslinger, M. Feuchter (Daimler), P. Du Bois (Consultant), M. Bischoff (University of Stuttgart)

Efficient Characteristic Identification of Plastic Materials for Crash Analysis with 3-Point Bending Machine
O. Ito, Y. Nakagawa, K. Kaneda, N. Matsuura, Y. Ueda (Honda R&D)

Room D

ISOGEOMETRIC I

Enabling the Analysis of Topologically Connected Multi-Patch Trimmed NURBS Shells in LS-DYNA
S. Hartmann (DYNAmore), L. Leidinger (BMW), L. Li, A. Nagy, M. Pigazzini, D. Benson (LSTC)

Explicit Isogeometric B-Rep Analysis on Trimmed NURBS-Based Multi-Patch CAD Models in LS-DYNA
L. Leidinger (BMW)

Room E

ISOGEOMETRIC II

Isogeometric Analysis using the *IGA_INCLUDE_BEZIER Keyword in LS-DYNA
M. Sederberg (Coreform), M. Scott (Brigham Young University/Coreform)

Comparative Evaluation of Isogeometric Analysis and Classical FEM with regard to Contact Analysis
Z. Naveed, A. Kühhorn, M. Kober (BITU Cottbus-Senftenberg)

ELECTRIC VEHICLE II

Measurement of Electromagnetic Launcher Muzzle Velocity with Induced Voltage of B-Dot Probe
H.-K. Kim, M.-A. Woo, J. Kim (Pusan National University)

Battery Cooling Simulation using STAR-CCM+
D. Grimmeisen, M. S. Schneider (Cascate)

MANUFACTURING I

Impact Analysis of Polymeric Additive Manufactured Lattice Structures
G. Laird (Predictive Engineering), P. Du Bois (Consultant)

Development of a Process Simulation Model of a Pultrusion Line
M. Duhr, P. Aswale, D. Schommer, J. Hausmann (Institut für Verbundwerkstoffe)

WORKSHOP

Phase Transformation of Metallic Materials
M. Merten, T. Klöppel (DYNAmore)

Several phase change models in LS-DYNA provide the possibility to numerically predict the distribution of process dependent material properties. The workshop gives a brief overview on existing models and discusses the recently developed material *MAT_254 in some detail. Possible approaches to calibrate this complex material model based on given experimental results are shown. In a first example, an isothermal TTT-Diagram is used to define a material card for the press hardening steel 22MnB5. A second show case demonstrates the potential application of the material model to the bake hardening effect of 6xxx aluminium alloys.

Coupling of a Foaming Process and Material Modeling with LS-DYNA
T. Schäfer, C. Hinse (SimpaTec)

18:15
End of presentations

19:00 RECEPTION IN THE EXHIBITION HALL

20:00 GALA DINNER IN PLENARY ROOM
Room F

HIGH SPEED IMPACT III

Numerical Methods for the Analysis of Behind Armor Ballistic Trauma
P. Zochowski (Military Institute of Armament Technology)

Fluid-Composite Structure-Interaction in Underwater Shock Simulations
B. Özarmut, A. Rühl, B. Hennings, D. Nømmersen, A. Paul (thyssenkrupp Marine Systems)

Bolted Joint Connections of FRP-Components in Submarines Subjected to Underwater Shock
A. Rühl, B. Özarmut, B. Hennings, D. Nømmersen, A. Paul (thyssenkrupp Marine Systems)

Room G

FIBER REINFORCED POLYMERS II

Development of a User-Defined Material Model for Sheet Molding Compounds
D. Schummer, M. Duhovic, J. Hausmann (Institut für Verbundwerkstoffe); H. Andrae, K. Steiner (Fraunhofer ITWM); M. Schneider (KIT)

Adaptive Mesh Segmentation for Modeling Dynamic Delamination Initiation and Propagation in Thick Composite Laminates
J. Selvaraj, L. Kawashita, G. Allegri, S. Hallitt (University of Bristol)

Numerical Investigation of Parameters Affecting Crush Mode of Triggered FRP Tube
R. Akita (Itochu Techno-Solutions Corporation); A. Koike (Isuzu Advanced Engineering Center); A. Yokoyama (Kyoto Institute of Technology)

Room E

HPC I

Dynamic Load Balancing
B. Wainscott (LSTC)

LS-DYNA Automatic Re-Decomposition
E. Yeux, C. Tsay, J. Wang (LSTC)

Leveraging LS-DYNA Explicit and Implicit on Latest Intel Technologies
N. Meng (Intel); J. Wang, R. Lucas (LSTC)

Room H

WORKSHOP

Solution Explorer in LS-PrePost – a GUI for Nonlinear Implicit FE
T. Borrvall (DYNAmore Nordic)

The advent of multiphysics capabilities in LS-DYNA has made it a very powerful, albeit somewhat complicated, simulation product. To this end, the Solution Explorer was introduced to simplify modeling setup in fluid mechanics, and this has now been complemented with a framework for nonlinear implicit mechanics. The vision of the Solution Explorer is to combine simplicity and power in an integrated pre- and post-environment, and this workshop presents its current state. We cover pre- and post-processing for single and multiple cases, in hope that it will provide a clear picture of its future potential.

AGENDA – WEDNESDAY, 15 MAY 2019

16:40

Simulation Data Management with SCALE products
M. Thiele (SCALE)

The workshop gives an overview of the SCALE SDM products such as LoCo, CAViT and Status.E. There will be a discussion on how to benefit from SCALE solutions as a user or project manager. The application of selected uses cases will be presented within live demos. Examples of typical CAE workflows and process automation using SCALE SDM applications are introduced. A lively discussion at the end of the workshop is very welcome to investigate potential integration of SDM software in your environment.

19:00

GALA DINNER IN PLENARY ROOM

20:00

RECEPTION IN THE EXHIBITION HALL

Program subject to alterations.
### Room B

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
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<tbody>
<tr>
<td>08:30</td>
<td>Development of Simple Connection Model for Plastic Parts in Low-Speed Crash Simulation</td>
</tr>
<tr>
<td></td>
<td>S. Matsuzuka, Y. Nakagawa, O. Ito, K. Kameda, Y. Ueda (Honda R&amp;D)</td>
</tr>
<tr>
<td>08:55</td>
<td>Modeling of Bolts using the GISSMO Model for Crash Analysis</td>
</tr>
<tr>
<td></td>
<td>F. Schauwecker (Daimler/University of Stuttgart), M. Feucht, M. Beck, D. Moncayo (Daimler), F. Andrade (DYNAmore), Prof. P. Middendorf (University of Stuttgart)</td>
</tr>
<tr>
<td>09:00</td>
<td>Multi-Scale Numerical Simulations of Structural Joints with Flow-Drill Screws using a Virtual Material Calibration</td>
</tr>
<tr>
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<td>M. Costas, D. Morin, M. Langseth (NTNU)</td>
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<tr>
<td>09:40</td>
<td>A Cohesive Model for Ice and its Verification with Tensile Splitting Tests</td>
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<tr>
<td></td>
<td>H. Herrling, L. Kellner, J. M. Kubiczek, S. Ehlers (TUHH)</td>
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<tr>
<td>10:10</td>
<td>Simulation of Process-Dependent Properties with MAT_254 Demonstrated for the ‘Bake-Hardening’ of an 8xxx Aluminum Alloy</td>
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<tr>
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<td>M. Mertens, T. Klüppel (DYNAmore), S. Jurendic, Z. Liang (Novelis)</td>
</tr>
<tr>
<td>10:40</td>
<td>Simulation of Time and Temperature dependent Artificial Ageing Process of an AA6xxx-T4 Aluminium Sheet Material using MAT 254</td>
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<td>S. Jurendic, Z. Liang (Novelis), M. Mertens, T. Klüppel (DYNAmore)</td>
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### Room C

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Numerical Simulation of Low Velocity Impact on Sandwich Structures with Steel Skins and Polymer Foam Cores</td>
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<td>T. Berstad, A. Reyes, T. Barvik (NTNU)</td>
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<tr>
<td>08:55</td>
<td>High-Strength Alloys: Modelling Dynamic and Multiaxial Loading Conditions</td>
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<td>A. Trippel (Institut für nachhaltige technische Systeme), W. Harwick (Fraunhofer EMI)</td>
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<tr>
<td>09:00</td>
<td>Influence of Strain Rate on Deformation and Failure Behavior of Sheet Metals under Shear Loading</td>
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<td>S. Klütschke, A. Trondl, F. Huberth (Fraunhofer EMI)</td>
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<tr>
<td>09:40</td>
<td>MAT_291: A New Micromechanics-Inspired Model for Shape Memory Alloys</td>
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<td>J. Karlsson (DYNAmore Nordic), S. Kari, R. Djuhne, S. Kashyap (Medtronic)</td>
</tr>
<tr>
<td>10:10</td>
<td>Validation of a New Thermal Radiation Problem using &quot;BOUNDARY_RADIUSIATION_ENCLOSE&quot;</td>
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<td>G. Blankenhorn, R. Grimes, F.-H. Rouet, I. Gao (LSTC), S. Malcom, B. Gyesi (Honda R&amp;D)</td>
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<tr>
<td></td>
<td>Prof. A. Gilat, J. Seidt, S. Spulak, J. Smith (Ohio State University)</td>
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### Room D

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Compact Lightweight Steel Hood Design and Development using ACP OpDesign</td>
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<td>J. Stanik [Hyundai America Technical Center], A. Shrawan, D. Mittal, A. Farahani (ETA)</td>
</tr>
<tr>
<td>08:55</td>
<td>Adapative Sampling using LS-OPT</td>
</tr>
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<td></td>
<td>A. Basudhar (LSTC)</td>
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<tr>
<td>09:00</td>
<td>Parameter Estimation with LS-OPT: Addressing Noise, Hysteresis and Spurious Data in DIC and other Applications</td>
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<tr>
<td></td>
<td>S. Du Bois (DYNAmore), N. Stander, A. Basudhar (LSTC)</td>
</tr>
<tr>
<td>09:40</td>
<td>First Steps Towards Machine-Learning Supported Material Parameter Determination</td>
</tr>
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<td>D. Kob, A. Haufe (DYNAmore)</td>
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</tbody>
</table>

### Plenary P

#### Plenary P: Keynote Presentations - Farewell

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>13:00</td>
<td>Fusion of Composite Simulation with Enhanced Data Acquisition and Data Science: Opportunities and First Approaches</td>
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<tr>
<td></td>
<td>Prof. P. Middendorf (University of Stuttgart)</td>
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<tr>
<td>14:00</td>
<td>Drop and Impact Simulation of Handheld Outdoor Products with LS-DYNA and Digimat</td>
</tr>
<tr>
<td></td>
<td>M. Palm (Husqvarna Group)</td>
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<tr>
<td>15:00</td>
<td>Recent Developments in LS-DYNA – Part II</td>
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<tr>
<td></td>
<td>T. Erhart (DYNAmore), T. Borrvaal (DYNAmore Nordic)</td>
</tr>
<tr>
<td>15:30</td>
<td>Farewell</td>
</tr>
<tr>
<td></td>
<td>T. Münz (DYNAmore)</td>
</tr>
</tbody>
</table>
AGENDA – THURSDAY, 16 MAY 2019

**Room F**

**HIGH SPEED IMPACT V**

- Blast Loading of Concrete: Simulations of Tubular Structures Subjected to Internal Detonations
  - M. Kristoffersen, T. Barvik (NTNU); K. O. Hauge [Norwegian Defence Estates Agency]; A. Minoretti [Norwegian Public Roads Administration]

- Study on Blast and Ballistic Loading of Auxetic Composite Sandwich Panels with LS-DYNA
  - N. Novak, L. Starčević, M. Vesenjak, Prof. Z. Ren [University of Maribor]

- Ballistic Behaviour of UHMWPE Composite Material: Experimental Characterization and Numerical Simulation

- Modelling Back Face Deformation of Woven Layered Composite Targets under Oblique Impact
  - M. Seidl, N. Faderl, M. Becker [ISL]

**Room G**

**FIBER REINFORCED POLYMERS III**

- Composites in High Voltage Applications
  - C. Weinberger, M. Rollant [4a engineering]

- Polypropylene Composites under Impact: Anisotropy, Mapping and Failure Criteria in Simulations, and Validation on a Part for Building and Construction Industry
  - M. Nutini, M. Vitali [Basel Poliolefine Italia, a LyondellBasell Company]; M. Benanti, S. Formolo [Polytech]

- A Simple Material Model for Composite Based on Elements with Realistic Stiffness
  - T. Tryland [Sintef Manufacturing]

- Design Right at the First Time Automotive Components by using Advanced Multiscale Approach with Dipimat
  - H. Skhiri [e-Xstream]

**Room E**

**CIVIL ENGINEERING**

- Drag Force Simulation on Blast Loaded Fabric Roof
  - M. Hadijoannou, E. Sammarco, M. Barsotti [Protection Engineering Consultants]

- LS-DYNA on the West White Rose Project
  - J. Fisk [Arup]

- Use of LS-DYNA for Structural Fire Engineering
  - E. rackauskaite, G. Flint, A. Maani, A. Temple, P. Kotsovinos [Arup]

**Room H**

**WORKSHOP**

- Failure Prediction in Crash Simulations with the GISSMO Model
  - F. Andrade [DYNAmore]

  This workshop is indicated to all LS-DYNA users who want to take their first steps regarding failure modeling in crash simulations.

  The subject will be addressed during the workshop where relevant aspects concerning failure prediction will be reviewed and the application of the GISSMO model for such simulations will be demonstrated.

**HIGH SPEED IMPACT VI**

- Experimental and Numerical Study of Submillimeter-Sized Hypervelocity Impacts on Honeycomb Sandwich Structures

- Numerical Modeling of Honeycomb Structure Subjected to Blast Loading
  - M. Stanczak, T. Fras, L. Blanc [ISL]; Pawłowski [Polish Academy of Sciences, Warsaw/ISL]; A. Rusinek [Lorraine University]

- High Velocity Impact Response of High Strength Aluminum using LS DYNA
  - G. Bayaras, E. Ozbayramoglu, O. Bütün, E. Oguz [FINSA Savunma Sistemleri]; Prof. E. Gürses [Orta Doğu Teknik Üniversitesi]

- IRIS 3 Program: Study of the Vibrations Induced by a Missile Impact on a Reinforced Concrete Structure
  - N. Van Dorsellaar, T. Legaud, V. Lapoujade [Thiot-Ingenierie]; B. Richard [Institut de Radioprotection et de Sûreté Nucléaire]

**FIBER REINFORCED POLYMERS IV**

- Composite Forming Simulation with Introduction to J-Composites/Form Modeler Version 2.0
  - M. Nishi, S. Wang, S. Dougherty [USOL]; X. Zhu [LSSTC]

- New Methods for Compression Molding Simulation and Component Strength Validation for Long Carbon Fiber Reinforced Thermoplastics
  - S. Hayashi [LSTC]; C.T. Wu, W. Hu, Y. Wu, X. Pan, H. Chen [LSTC]

- Modeling of Microcellular Short Fiber Reinforced Plastics for Pedestrian Safety Analysis
  - M. Landervik [DYNAmore Nordic]; U. Westberg [Volvo Cars]; S. Gastl [Borealis Polyolefine]

**IMPLICIT**

- DDAM Analysis with LS-DYNA
  - Y. Huang, J. Cui [LSTC]

- FEM-BEM Coupling with Ferromagnetic Materials
  - T. Ruberg, L. Kiethorn, J. Zechner [Tarlisit]

**WORKSHOP**

- LS-DYNA with LS-FORM
  - X. Zhu, J. He [LSTC]

  The workshops feature both informative and how-to knowledge with demonstrations of the latest features from experts.

  The aim is to provide the attendees with insights, limits and merits of the topic. It facilitates the understanding by showcasing simple examples that explain the methods. Besides the presentation there will be time for interactions between the presenters and the audience.

**IMPLICIT**

- New Options in Frequency Domain Analysis and Fatigue Analysis with LS-DYNA
  - Y. Huang [LSTC]

- Running Jet Engine Models on Thousands of Processors with LS-DYNA

Program subject to alterations.
EXHIBITORS

32 4a engineering
28 ARUP/Oasys
27 BIAS
26 BETA CAE Systems/Lasso
22 CADLM
04 CASCADE
21 DatapointLabs
02/34 DYNAmore/LSTC/ETA
29 DYNAmore Laboratory
03 DynaS+ / DEP
05 DynaWeld
06 e-Xstream engineering
07 Intel/Fujitsu
26 Lasso/BETA CAE Systems
25 Magna Powertrain Engineering Center Steyr
09 NEC
08 Nordmetall
33 Oracle
13 Predictive Engineering
01 DynaS+ / DEP
03 Rescale
05 DynaWeld
10 JSOL
26 Lasso/BETA CAE Systems
25 Magna Powertrain Engineering Center Steyr
12 Shanghai Enhu
11 Shanghai Fangkun
17 T-Systems
18 Univ. Erlangen-Nürnberg
35 extreme project
19 Xitadel

CONFERENCE ORGANIZERS

The conference will be organized by

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