

Conference Agenda

10th EUROPEAN LS-DYNA CONFERENCE

15 - 17 JUNE 2015 – WÜRZBURG, GERMANY



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Microsoft Azure

Monday, 15 June

		Plenary Room							
Exhibition	12:55	Welcome/Keynote Presentations							
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
	15:40	Crash Failure	Occup. Safety Airbags	Materials Plastics	Process Metal Forming	Simulation Multiphysics	IT Perform. Scalability	Workshop ICFD	Workshop LS-OPT
	17:30	Crash Failure	Human Models	Developer Frequency Dom.	Process Metal Forming	Simulation Impact/Cracks	IT Perform. Scalability	Workshop EM	Workshop LS-PrePost
	18:45	Food, drinks and live music in the exhibition hall							

Tuesday, 16 June

	07:00	Running LS-DYNA (45 min. jogging)							
Exhibition		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
	08:20	Optimization Robustness	Occup. Safety Dummies	Materials Endless Fibers	Process Metal Forming	CAE Processes	IT Cloud		Workshop GISSMO
	10:30	Optimization General	Occup. Safety Dummies	Materials Short/Long Fiber	Process Composites	SDM - Model Reduction	IT Cloud	Particle SPH/DEM	Workshop OpenForm
	12:10	Lunch							
		Plenary Room							
	13:30	Keynote Presentations							
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
15:45		Crash Connection	Optimization Topology	Materials Adhes./Failure	Process Misc	Process Welding	Developer LS-PrePost/Map.	Workshop DEM	Workshop LoCo
17:25		Crash Connection/Misc.	Optimization Topology	Materials Composites	Process Deep Drawing	Process Welding	Developer Multiphysics	Workshop Airbag Particle	Workshop Implicit
	19:00	Get together in the exhibition hall							
	20:00	Gala dinner in Frankonia Saal							

Wednesday, 17 June

Exhibition		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
	08:30	Crash Ships/Planes	Multiphysics CFD/FSI	Simulation Blast/Penetr.	Process Cutting/Model	Simulation Materials	Developer Misc	Workshop 4a Material	Workshop eta/DYNAFORM
	10:40	Crash Material	Multiphysics CFD/FSI	Simulation Blast/Penetr.	Simulation Cracks	Simulation Drop Test/Bio.	Developer Elements	Workshop Welding/Heat	Workshop Composites
	12:20	Lunch							
	Plenary Room								
	13:30	Keynote Presentations/Farewell							
	16:45	End of conference							

PLENARY ROOM

pp 23-30

WELCOME – KEYNOTE & PLENARY PRESENTATIONS I

Chair: U. Franz, Prof. K. Schweizerhof (DYNAmore)

12:55 **Welcome**

13:00 **Recent Developments in LS-DYNA – Part I**

J. O. Hallquist, [B. Wainwright](#) and other developers (LSTC)

13:40 **Crash CAE in the all New Volvo XC90 and SPA Platform**

[A. Sandahl](#), J. Jergeus, O. Centeno, D. Macri, A. Ericsson, W. Wu, E. Claesson, P. A. Eggertsen, M. Retzlaff, M. Khoo (Volvo Car)

14:10 **Modeling the Press Hardening Process**

Prof. M. Oldenburg (Luleå University of Technology)

14:40 **Big Compute/HPC in Microsoft Azure**

T. Karmarkar (Microsoft)

15:00 Break

ROOM 1

pp 45-52

CRASH I – FAILURE

Chair: S. Frik (Adam Opel)

15:40 **Prediction of Dynamic Material Failure – Part I: Strain Rate Dependent Plastic Yielding**

M. Feucht (Daimler); R. Böhm (Karlsruher Institut für Technologie); P. Du Bois (Consultant); F. Andrade, [A. Haufe](#) (DYNAmore)

16:05 **Prediction of Dynamic Material Failure – Part II: Application with GISSMO in LS-DYNA**

[F. Andrade](#), A. Haufe (DYNAmore); M. Feucht (Daimler); R. Böhm (Karlsruher Institut für Technologie); P. Du Bois (Consultant)

16:30 **Modeling of Strain-Rate Dependence of Deformation and Damage Behavior of HSS- and UHSS at Different Loading States**

[A. Trondl](#), D. Sun (Fraunhofer IWM)

16:55 Break

pp 53-60

CRASH II – FAILURE

Chair: M. Feucht (Daimler)

17:30 **Development of an Anisotropic Material Model for the Simulation of Extruded Aluminum under Transient Dynamic Loads**

[A. Smith](#) (Honda R&D Americas); P. Du Bois (Consultant); T. Borrval (DYNAmore Nordic)

17:55 **The Numerical Failure Prediction by the Damage Model GISSMO in Various Materials of Sheet Metal**

[S. Chinzei](#), J. Naito (KOBEL Steel)

18:20 **An Investigation of Modeling Approaches for Material Instability of Aluminum Sheet Metal using the GISSMO-Model**

[G. Falkinger](#) (Leichtmetallkompetenzzentrum Ranshofen LKR); P. Simon (AMAG Rolling)

18:45 **GET TOGETHER – FOOD, DRINKS AND LIVE MUSIC IN THE EXHIBITION HALL**

ROOM 2

pp 215-222

OCCUPANT SAFETY I – AIRBAGS

Chair: M. Walz (Daimler)

Numerical Simulation of the Laser Scoring Line Behavior in Airbag Deployment

[M. Nutini](#), M. Vitali (Basell Poliolefin Italia); S. Bianco, D. Brancadoro, A. Luera, D. Marino (FCA); M. Olivero (CRF)

CAE Analysis of Passenger Airbag Bursting through Instrumental Panel Based on Corpuscular Particle Method

[Y. Feng](#), M. Beadle (Jaguar Land Rover)

Using JFOLD & LS-DYNA to Study the Effects of Folding on Airbag Deployment

R. Taylor (Arup), [S. Hayashi](#) (JSOL)

HUMAN MODELS

Chair: M. Iwamoto (Toyota Central R&D Labs)

The Effects of Active Muscle Contraction into Pedestrian Kinematics and Injury During Vehicle-Pedestrian Collision

[I. Putra](#), J. Carmai, S. Koetniyom (King Mongkut's University of North Bangkok); B. Markert (RWTH Aachen/University of Agder)

Stability and Sensitivity of THUMS Pedestrian Model and its Trauma Response to a Real-Life Accident

L. Wen, [C. Bastien](#), M. Blundell, C. Neal-Surgess (Coventry University); K. Kayvantash (CADLM)

The CASIMIR Model for Simulation in Seating Comfort Applications – A Status Update for LS-DYNA

[N. Lazarov](#), D. Fressmann (DYNAmore); [A. Siefert](#) (Wölfel Beratende Ingenieure)

ROOM 3

pp 169-178

MATERIALS I – PLASTICS

Chair: A. Droste (DOW Automotive)

Failure of Thermoplastics – Part 1: Characterization and Testing

A. Fertschej, P. Reithofer, [M. Rollant](#) (4a engineering)

Failure of Thermoplastics – Part 2 Material Modeling and Simulation

[A. Fertschej](#), P. Reithofer, M. Rollant (4a engineering)

Macroscopic Modeling of Flow-Drill Screw Connections

J. K. Sønstabø, [D. Morin](#), M. Langseth (Norwegian University of Science and Technology)

pp 371-376

DEVELOPER I – FREQU. DOMAIN

Chair: n.n.

Recent Updates in LS-DYNA Frequency Domain Solvers

[Y. Huang](#), Z. Cui (LSTC)

Statistical Energy Acoustic for High Frequencies Analysis

[M. Souli](#), R. Messahel (University Lille); Y. T. Zeguer (Jaguar Land Rover); Y. Huang (LSTC)

ROOM 4

pp 93-100

PROCESS I – METAL FORMING

Chair: M. Kjell (Chalmers Univ.)

Simulation Aspects for the Application of High Strength Steel Materials in Forming Processes

[L. Keßler](#), T. Beier, H. Richter (ThyssenKrupp Steel Europe)

A Combined Technological Proofing Method for Deep Drawing and Stretch Forming of Sheet Metal Materials

R. Hennig (Aleris Rolled Products Germany)

Developments in LS-DYNA for Metal Forming Simulations

[X. Zhu](#), L. Zhang (LSTC)

pp 101-108

PROCESS II – METAL FORMING

Chair: M. Schill (DYNAmore Nordic)

Comprehensive Correlation of Seat Track Assembly – From Forming to Assembly Test

[S. Sinne](#), H. Klose, V. J. Dura Brisa, P. Partheymüller (Brose Fahrzeugteile)

Creation and Validation of Material Cards for Aluminium Sheet Metal Materials

R. Hennig (Aleris Rolled Products Germany)

Evaluation of Kinematic Hardening Models for Multiple Stress Reversals under Continuous Cyclic Shearing and Multi-Step Bending

S. Suttner, [M. Rosenschon](#), Prof. M. Merklein (University of Erlangen-Nürnberg)



B. Wainscott
LSTC



A. Sandahl
Volvo Car Corp.



Prof. M. Oldenburg
Luleå University
of Technology

ROOM 5 pp 249-260

SIMULATION I – MULTIPHYSICS

Chair: V. Lapoujade (DynaS+)
Simulation of the Electromagnetic Flux Compression using LS-DYNA Multi-Physics Capability
K. Takekoshi (Terrabyte)

Numerical Methodology for Thermal-mechanical Analysis of Fire Doors
A. Bozzolo, C. Ferrando (D'Appolonia - RINA Group); A. Tonelli, E. Cabella (RINA Group)

A Contribution to CESE Method Validation in LS-DYNA
E. Grippon, N. Van Dorsselaer, V. Lapoujade (DynaS+)

ROOM 6 pp 411-418

IT PERFORMANCE/SCALABILITY I

Chair: M. Bernreuther (Univ. Stuttgart)
Improvement of Domain Decomposition of LS-DYNA R7 and R8
M. Makino (Dynamower)

Performance Optimizations for LS-DYNA with Mellanox HPC-X Scalable Software Toolkit
P. Lu, D. Cho, G. Shainer, S. Schultz, B. Klaff (Mellanox Technologies)

Characterizing LS-DYNA Performance on SGI Systems using SGI MPI Inside MPI Profiling Tool
T. DeVarco, O. Schreiber, A. Altman, S. Shaw (Silicon Graphics)

ROOM 7

WORKSHOP

Tutor: I. Caldichoury (LSTC)
Setting up an ICFD Simulation in LS-DYNA

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.

ROOM 8

WORKSHOP

Tutor: D. Aspenberg (DYNAmore Nordic)
Material Parameter Identification with LS-OPT

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pp 261-266

SIMULATION II – IMPACT/CRACKS

Chair: O. Voikina (Strela)
Hail Impact Problem in Aeronautical Field
A. Prato, M. Anghileri, L. Castelletti (Politecnico di Milano)

Simulation of Bird Strike on Airplane Wings by Using SPH Methodology
M. Guler (TOBB University of Economics and Technology); T. Kiper Elibol (Turkish Aerospace); I. Uslan (Gazi University); M. Buyuk (Turkish Standards Institution)

pp 419-424

IT PERFORMANCE/SCALABILITY II

Chair: Prof. U. Göhner (DYNAmore)
Fast Road Barrier Car Safety Calculations on a Cray XC
J. Cholewinski, A. Findling, G. Clifford (Cray); M. Piechnik (Stalprodukt)

Cost-Effective Sizing of Your HPC Cluster for CAE Simulations
N. Henkel, S. Treiber (GNS Systems)

Cloud-Enabled CAE Solutions: Requirements, Basic Concepts and Usability
A. Heine (CPU 24/7)

WORKSHOP

Tutor: I. Caldichoury (LSTC)
Setting up an EM Simulation in LS-DYNA

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WORKSHOP

Tutor: P. Ho (LSTC)
Meshing and Postprocessing with LS-PrePost

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07:00 Running LS-DYNA (45 min. jogging)

MORNING SESSIONS

	ROOM 1 pp 317-324 OPTIMIZATION I – ROBUSTNESS	ROOM 2 pp 223-230 OCCUPANT SAFETY II – DUMMIES	ROOM 3 pp 179-188 MATERIALS II – ENDLESS FIBERS	ROOM 4 pp 109-116 PROCESS III – METAL FORMING
08:20	Chair: T. Zeguer (Jaguar Land Rover) Recent Advances on Surrogate Modeling for Robustness Assessment of Structures with Respect to Crashworthiness Requirements <u>Prof. F. Duddeck</u> , E. Wehrle (Technical University Munich)	Chair: K. Pydimarry (Honda R&D Americas) Optimal Forces for the Deceleration of the ES-2 Dummy J. Fehr, <u>J. Köhler</u> , C. Kleinbach (University of Stuttgart)	Chair: P. Reithofer (4a Engineering) Textile and Composite Modeling on a Near Micro-Scale: Possibilities and Benefits <u>O. Döbrich</u> , T. Gereke, C. Cherif (Technical University Dresden)	Chair: A. N. Keisoglu (ETA) Parameter Identification for Forming Simulations of High-Strength Steels <u>M. Thomisch</u> , Prof. M. Kley (University Aalen)
08:45	Robustness Analysis of a Vehicle Front Structure Using Statistical Approach M. Okamura (JSOL)	Assessment of Motorcycle Helmet Chin Bar Design Criteria with Respect to Basilar Skull Fracture Using FEM <u>S. Farajzadeh Khosroshahi</u> , M. Ghajari (Imperial College London); U. Galvanetto (University of Padova)	Micro-Meso Draping Modeling of Non-Crimp Fabrics <u>O. Vorobiov</u> , T. Bischoff, A. Tulke (FTA Forschungsgesellschaft für Textiltechnik Albstadt)	ACP Process Integrated 3B Forming Optimization <u>A. Farahani</u> , D. Mittal (Engineering Technology Associates); J. Shaw (US Steel)
09:10	Improving Robustness of Chevrolet Silverado with Exemplary Design Adaptations Based on Identified Scatter Sources <u>D. Borsotto</u> , R. Strickstroock, C. A. Thole (Sidact)	CAE Validation Study of a Side Window Impact using Plexiglas Materials <u>D. Lopez Ruiz</u> (Tecosim Technische Simulation); A. Rühl, Prof. S. Kolling (THM Giessen); E. Ruban, B. Kiese-wetter, S. Ulzheimer (Evonik Industries)	Numerical Investigation of Carbon Braided Composites at the Mesoscale: Using Computer Tomography as a Validation Tool <u>M. Vinot</u> , M. Holzapfel, R. Jemmali (German Aerospace Center)	Influence of Variations in a Mechanical Framing Station on the Shape Accuracy of S-Rail Assemblies K. Wiegand, <u>T. Konrad</u> , (Daimler); M. Merklein (University of Erlangen-Nürnberg)
09:35	Classification-based Optimization and Reliability Assessment using LS-OPT <u>A. Basudhar</u> , I. Gandikota, N. Stander (LSTC); A. Svedin, C. Belestam (DYNAmore Nordic); K. Witowski (DYNAmore)	Agile Dummy Model Development Illustrated by Refinement Activities of the WorldSID Shoulder Model R. Brown, G. Stokes (Jaguar Land Rover); U. Franz, <u>S. Stahlschmidt</u> (DYNAmore)	Modeling of Thick UD Composites for Type IV Pressure Vessels <u>R. Matheis</u> , H. Murnisya (fka Aachen); T. Johansson (DYNAmore Nordic)	Structural Analysis of an Automotive Forming Tool for Large Presses Using LS-DYNA <u>K. Swidergal</u> , Prof. M. Wagner (OTH Regensburg); C. Lubeseder, I. von Wurmb, J. Meinhardt (BMW Group); S. Marburg (University of the Federal Armed Forces)
10:00	Break pp 325-332 OPTIMIZATION II – GENERAL	pp 231-238 OCCUPANT SAFETY III – DUMMIES	pp 189-198 MATERIALS III – SHORT/LONG FIBER	pp 117-126 PROCESS IV – COMPOSITES
10:30	Chair: H. Kasseger (Magna Steyr) Some LS-OPT Applications in the CAE Development of Injection Molded Thermoplastic Parts A. Wüst (BASF)	Chair: R. Reichert (George Mason Univ.) LS-DYNA Model Development of the THOR-M <u>I. Maatouki</u> , P. Lemmen (Humanetics Europe); Z. Zhou (Humanetics Innovative Solutions)	Chair: A. Droste (DOW Automotive) Digital Material Model for Short Fiber Reinforced Plastics at Volvo Car Corporation <u>M. Landervik</u> (DYNAmore Nordic); J. Jergeus (Volvo Car)	Chair: A. Haufe (DYNAmore) Simulation of Forming of Paperboard Packaging using LS-DYNA <u>M. Schill</u> , J. Karlsson (DYNAmore Nordic); J. Tryding (Tetra Pak)
10:55	Optimization of a Lower Bumper Support regarding Pedestrian Protection Requirements using ANSA and LS-OPT I. Wetzstein, <u>B. Lauterbach</u> , N. Erzgräber, L. Harzheim (Adam Opel)	LS-DYNA Model Development of the Harmonized Hybrid III 05F Crash Test Dummy C. Shah (Humanetics Innovative Solutions); <u>C. Kleeßen</u> , R. Kant, P. Lemmen (Humanetics Europe)	Simplified Integrative Simulation of Short Fibre Reinforced Polymers under Varying Thermal Conditions <u>C. Witzgall</u> , Prof. S. Wartzack (University of Erlangen-Nürnberg)	Forming Simulation of Textile Composites Using LS-DYNA <u>M. Nishi</u> , T. Hirashima (JSOL)
11:20	X760 Bumper Automation and Optimization Process T. Zeguer (Jaguar Land Rover)	H-Point Machine and Head Restraint Measurement Device Positioning Tools – Extended Capabilities B. Walker, <u>L. Cowlam</u> , J. Dennis (Arup); S. Albery, N. Leblanc (Futuris)	Recent Enhancements on Short-Fiber Reinforced Plastics Modeling in LS-DYNA <u>C. Liebold</u> , A. Erhart (DYNAmore)	A Graphical User Interface for Simulating Resin-Transfer-Molding Combining LS-DYNA and OpenFOAM <u>M. Wagner</u> , M. Martins-Wagner (OTH Regensburg); A. Haufe, C. Liebold (DYNAmore)
11:45	Multi-Scale Material Parameter Identification using LS-DYNA and LS-OPT <u>N. Stander</u> , A. Basudhar, U. Basu, I. Gandikota (LSTC); V. Savic (General Motors Company); X. Sun, K. Sil Choi, X. Hu (Pacific Northwest National Laboratory); Prof. F. Pourboghrat, T. Park, A. Mapar (Michigan State University); S. Kumar, H. Ghassemi-Armaki (Brown University); F. Abu-Farha (Clemson University)	Investigation of Seat Modeling for Sled Analysis and Seat Comfort Analysis with J-SEATdesigner <u>N. Ichinose</u> , H. Yagi (JSOL)	Short and Long Fiber Reinforced Thermoplastics Material Models in LS-DYNA S. Hartmann, T. Erhart, A. Haufe (DYNAmore); <u>P. Reithofer</u> , B. Jilka (4a engineering)	Modeling Non-Isotermal Thermoforming of Fabric-Reinforced Thermoplastic Composites <u>D. Schommer</u> , M. Duhovic, J. Hausmann (University of Kaiserslautern)
12:10	Lunch break			

ROOM 5 pp 441-450

CAE PROCESSES

Chair: R. Luijkx (AUDI)

Crashworthy Design of Composite Structures Using CAE Process Chain
M. Chatiri (Cadferm); T. Schütz (Adam Opel); Prof. A. Matzenmiller (University of Kassel)

New Technologies for Side Impact Model Set-Up

T. Fokilidis, A. Lioras (BETA CAE Systems)

Speeding up the Pedestrian Protection CAE Process

G. Newlands, C. Archer (Arup)

Increasing Efficiency of the Design Process with an Isogeometric Analysis Plugin for Siemens NX by Analyzing the CAD Model Directly

M. Breitenberger, B. Philipp, R. Wüchner, K.-U. Bletzinger (Technical University Munich); S. Hartmann, A. Haufe (DYNAmore)

pp 451-460

SDM & MODEL REDUCTION

Chair: R. Hollamby (ARUP)

Using LoCo for Multi Run Simulations
R. Luijkx (AUDI); M. Thiele (SCALE)

New Developments in LoCo – the Innovative SDM System

M. Thiele, T. Landschoff (SCALE)

Machine Learning Approaches for Repositories of Numerical Simulation Results

Prof. J. Garcke, R. Iza Teran (Fraunhofer SCAI)

Small-Overlap Crash Simulation Challenges and Solutions

S. R. M. Arepalli, G. Kini, A. Gittens (ESI Group)

ROOM 6 pp 425-432

IT – CLOUD I

Chair: M. Makino (Dynapower)

Collaboration for Future HPC-based Simulation Technologies

A. Walser (Automotive Simulation Center Stuttgart)

CAE as a Service as Cloud Platform for the Full LS-DYNA Simulation Process

A. Geiger, K.-H. Hierholz, C. Neimöck (T-Systems)

Experiences with LS-DYNA on Cloud-like Infrastructure

Prof. U. Göhner (DYNAmore)

CAE Cluster in Microsoft Azure

T. Karmarkar, N. Greising (Microsoft); S. Bala (LSTC)

pp 433-440

IT – CLOUD II

Chair: S. Bala (LSTC)

Making HPC Accessible for SMEs
A. Wierse (Sicos BW)

Scaling LS-DYNA on Rescale – HPC Cloud Simulation Platform

J. Poort, I. Graedel (Rescale)

HPC on the Cloud: Gcompute Support for LS-DYNA Simulations

I. Fernandez, R. Diaz (Gridcore)

Smart Manufacturing: CAE as a Service, in the Cloud

W. Gentsch (The UberCloud)

ROOM 7

PARTICLE METHODS – SPH/DEM

Chair: N. Edjtemai (Consultant)

Application of the SPH Finite Element Method to Evaluate Pipeline Response to Slope Instability and Landslides

A. Fredj, A. Dinovitzer (BMT Fleet Technology); M. Sen (Enbridge Pipelines)

Modeling the Behavior of Dry Sand with DEM for Improved Impact Prediction

S. Sridhar, S. K. Vishwakarma (Whirlpool of India)

Volume-Averaged Stress States for Idealized Granular Materials using Unbonded Discrete Spheres in LS-DYNA

M. T. Davidson, J. H. Chung, V. Le (Bridge Software Institute); H. Teng, Z. Han (LSTC)

Discrete Element Analysis of Idealized Granular Geometric Packing Subjected to Gravity

M. Faraone, J. Chung, M. Davidson (University of Florida, Bridge Software Institute)

pp 363-370

ROOM 8

WORKSHOP

Tutor: F. Andrade (DYNAmore)

Material Failure using GISSMO

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WORKSHOP

Tutor: K. Kassem Manthey (GNS)

Creating Forming Simulations with OpenForm

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AFTERNOON SESSIONS

PLENARY ROOM

pp 31-36

KEYNOTE & PLENARY PRESENTATIONS II

- Chair: S. Bianco (FIAT Auto Group)
- 13:30 **Stochastic Simulations for Crash Worthiness and Occupant Protection**
T. Yasuki (Toyota Motor)
- 14:00 **Dummy-Positioning for a Whiplash Load Case using LS-DYNA Implicit**
A. Hirth (Daimler); A. Gromer (DYNAmore); T. Borrvall (DYNAmore Nordic)
- 14:30 **Usage of LS-DYNA in Metal Forming**
M. Fleischer, A. Lipp, J. Meinhardt, P. Hippchen, I. Heinle, A. Ickes, T. Senner (BMW Group)
- 15:00 **Enabling Effective and Easy to Access Simulation**
E. Schnepf (Fujitsu Technology Solutions); S. Gillich (Intel)
- 15:15 Break

ROOM 1

pp 61-68

CRASH III – CONNECTION

- Chair: B. Lauterbach (Adam Opel)
- 15:45 **Modeling Adhesively Bonded Joints with *MAT252 and *MAT_ADD_COHESIVE for Practical Applications**
F. Burbulla (Dr. Ing. h.c. F. Porsche); A. Matzenmiller, U. Kroll (University of Kassel)
- 16:10 **Practical Failure Criterion of Spot Weld for Crash Simulation**
J.-H. Lim, J. Ha, C.-Y. Oh (Posco)
- 16:35 **Macroscopic Modeling of Flow Drill Screw Connections**
J. K. Sønstabø, D. Morin, M. Langseth (Norwegian University of Science and Technology)
- 17:00 Break

pp 69-74

CRASH IV – CONNECTION/MISC.

- Chair: F. Burbulla (Dr. Ing. h.c. F. Porsche)
- 17:25 **Modeling of Self-Piercing Riveted Joints for Crash Simulation – State of the Art and Future Topics**
M. Bieër, S. Sommer (Fraunhofer IWM)
- 17:50 **Challenges in Tire Modeling for Small Overlap Crashworthiness**
S. Bala (LSTC)
- 18:15 **On Automatic Crash Model Translation**
E. Di Pasquale (SimTech/ Université de Valenciennes)

ROOM 2

pp 333-340

OPTIMIZATION III – TOPOLOGY

- Chair: E. DeHoff (Honda R&D Americas)
- A Weight Balanced Multi-Objective Topology Optimization for Automotive Development**
N. Aulig, S. Menzel (Honda Research Institute Europe); E. Nutwell (Ohio State University); D. Detwiler (Honda R&D)
- Topometry and Shape Optimization of a Hood**
Y. H. Han (Hyundai Motor Group); K. Witowski, N. Lazarov, K. Ananiev (DYNAmore)
- Meta-Model Based Optimization of Spot-welded Crash Box using Differential Evolution Algorithm**
A. Serdar Önal (Beyçelik Gestamp Kalip ve Oto Yan San. Paz. ve Tic.); N. Kaya (Uludağ University)

pp 341-348

OPTIMIZATION IV – TOPOLOGY

- Chair: F. Duddeck (Technical Univ. Munich)
- Topology Optimization of Transient Nonlinear Structures – A Comparative Assessment of Methods**
E. J. Wehrle, F. Duddeck (Technical University Munich); Y. H. Han (Hyundai Motor Group)
- Multidisciplinary Design Optimisation Strategies for Lightweight Vehicle Structures**
A. Prem, C. Bastien, M. Dickison (Coventry University)
- Optimization of Turbine Blade Fir Tree Root Geometry Utilizing LS-PrePost in Pre- and Postprocessing**
J. Jankovec (Research and Testing Institute Plzen)

ROOM 3

pp 199-208

MATERIALS IV – ADHES./FAILURE

- Chair: R. Sturt (ARUP)
- Strain-Rate Dependant Damage Material Model for Layered Fabric Composites with Delamination Prediction for Impact Simulations**
S. Treutenaere, F. Lauro, B. Bennani (University of Valenciennes and Hainaut Cambrésis); T. Matsumoto, E. Mottola (Toyota Motor Europe)
- Predicting Mechanical Behaviour of Reinforced Plastic and Composite Parts**
S. Calmels (e-Xstream engineering)
- Implementation of Peridynamic Theory to LS-DYNA for Prediction of Crack Propagation in a Composite Lamina**
T. Kahraman (MAN Turkey/ TOBB University of Economics and Technology); U. Yolum, M. A. Guler (TOBB University of Economics and Technology)

pp 209-214

MATERIALS V – COMPOSITES

- Chair: Stefan Kolling (THM Giessen)
- Damage in Rubber-Toughened Polymers – Modeling and Experiments**
M. Helbig (DYNAmore); T. Seelig (Karlsruhe Institute of Technology)
- Calculation and Validation of Material Tests with Specimens Made out of Filled Elastomers**
P. Thumann, K. Swidergal, Prof. M. Wagner (OTH Regensburg)

ROOM 4

pp 127-134

PROCESS V – MISC

- Chair: L. Keßler (ThyssenKrupp Steel)
- RollerPaG – a Tool for the Automatic Path Generation for Roller Hemming Simulation using LS-DYNA**
B. Boll (DYNAmore); O. Ghouati (Ford Research & Advanced Engineering)
- Simulation of the Manufacturing Process of Self-Piercing Rivets with LS-DYNA with Focus on Failure Prediction for Sheets and Rivet**
M. Buckley (Jaguar Land Rover); H. Gese, M. Reissner, G. Oberhofer (Matferm Partnerschaft)
- Towards Location Specific Statistical Fracture Prediction in High Pressure Die Castings**
R. Watson, W. Griffiths (University of Birmingham); T. Zeguer (Jaguar Land Rover); S. Ruffe (JVM Castings)
- Numerical Analysis of Multistep Ironing of Thin-Wall Aluminium Drawpiece**
L. Brodawka, M. Kociolek, M. Siedlik, R. Budzyn, A. Furman (Can-Pack); A. Rekas, T. Latos (AGH University of Science and Technology)
- Numerical Analysis of Relationship between Height and Geometry of Bottom of a Beverage Can and its Resistance to Increase in Internal Pressure**
L. Brodawka, M. Kociolek, M. Siedlik, R. Budzyn, M. Fijałkowski (Can-Pack); T. Latos, A. Rekas (AGH University of Science and Technology)
- Optimization of the Blank Holder Stiffness in Deep Drawing Processes by using FEA**
R. Radonjic, Prof. M. Liewald, F. Han (University of Stuttgart)

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PROCESS VI – DEEP DRAWING

19:00 RECEPTION IN THE EXHIBITION HALL

20:00 GALA DINNER IN PLENARY ROOM



T. Yasuki
Toyota Motor



A. Hirth
Daimler



M. Fleischer
BMW Group

ROOM 5 pp 143-150

PROCESS VII – WELDING

Chair: B. Hochholding (DYNAmore Swiss)

SimWeld and DynaWeld Software Tools to Setup Simulation Models for the Analysis of Welded Structures with LS-DYNA

T. Loose (Ingenieurbüro Tobias Loose);
O. Mokrov (RWTH Aachen)

A Finite Element Investigation Into the Continuous Induction Welding of Dissimilar Material Joints

M. Duhovic, J. Hausmann (Institut für Verbundwerkstoffe);
P. L'Epplattener, I. Caldichoury (LSTC)

Simulating the Induction Spot Welding of Hybrid Material Joints

M. Didi, D. Wind, M. Duhovic,
J. Hausmann (Technical University Kaiserslautern)

ROOM 6 pp 377-386

DEVELOPER II – PREPOST/MAPPING

Chair: A. Atallah (Faurecia)

Current Status of LS-PrePost and the New Features in Version 4.2

P. Ho (LSTC)

Non-Linear Fracture Mechanics in LS-DYNA and LS-PrePost

P. Lindström (University West/DNV GL Materials Laboratory);
A. Jonsson, A. Jernberg (DYNAmore Nordic);
E. Østby (DNV GL Materials Laboratory)

A Fabric Material Model with Stress Map Functionality in LS-DYNA

T. Borvall (DYNAmore Nordic);
C. Ehle, T. Stratton (Autoliv OTC)

ROOM 7

WORKSHOP

Tutor: N. Karajan (DYNAmore)

DEM Modeling in LS-DYNA

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.

ROOM 8

WORKSHOP

Tutor: M. Thiele (SCALE)

New Developments in LoCo – The innovative SDM Solution

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pp 151-158

PROCESS VIII – WELDING

Chair: W. Chung (Theme Engineering)

Numerical Simulation of Impact Welding Processes with LS-DYNA

C. Pabst, P. Groche
(Technical University Darmstadt)

Evaluation of Electromagnetism Capabilities of LS-DYNA: Alternative Heating Processes

E. Grippon, T. Senart, V. Lapoujade
(DynaS+)

Cohesive Contact Modeling in Thermoforming Simulations of Metal-CRFP-Metal Sandwich Sheets

Ö. Cebeçi (Consultant); A. Zeiser (Inpro Innovationsellschaft für fortgeschrittene Produktionssysteme in der Fahrzeugindustrie);
M. von Scheven (University of Stuttgart)

pp 387-394

DEVELOPER III – MULTIPHYSICS

Chair: D. Hilding (DYNAmore Nordic)

Generalized Anisotropic/Isotropic Porous Media Flows in LS-DYNA

R. R. Paz, F. Del Pin, I. Caldichoury (LSTC);
H. G. Castro (Conicet)

Chemically Reactive Flows in Airbag Inflator Chambers

K. Im, G. Cook Jr., Z. Zhang (LSTC)

Recent Developments in the Electromagnetic Module: A New 2D Axi-Symmetric EM Solver

P. L'Epplattener, I. Çaldichoury (LSTC)

WORKSHOP

Tutor: J. Wang (LSTC)

Get Stuck in using AIRBAG_PARTICLE? and Recent Development

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WORKSHOP

Tutor: T. Erhart (DYNAmore)

Setting up an Implicit Simulation in LS-DYNA

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	ROOM 1 pp 75-82	ROOM 2 pp 349-354	ROOM 3 pp 267-278	ROOM 4 pp 159-168
	CRASH V – SHIPS/PLANES	MULTIPHYSICS I – CFD/FSI	SIMULATION III – BLAST/PENETR.	PROCESS IX – CUTTING/MODEL
08:30	Chair: Y.-G. Chung (Kostech)	Chair: M. Redhe (DYNAmore Nordic)	Chair: P. Starke (Airbus Defence & Space)	Chair: Z. Ren (Univ. of Maribor)
08:55	Highly Advanced M&S System for Marine Accident Cause Investigation using FSI Analysis Technique S.-G. Lee, J.-S. Lee, H.-S. Lee (Korea Maritime and Ocean University)	A Numerical Investigation of Turbulent Flow in Circular U-Bend A. Miloud, M. Aounallah, O. Imine, M. Guen (University of Science and Technology of Oran Algeria)	An Advanced Identification Procedure for Material Model Parameters based on Image Analysis L. Peroni, M. Scapin, C. Fichera (Politecnico di Torino)	The Influence of Johnson-Cook Parameters on SPH modeling of Orthogonal Cutting of AISI 316L A. A. Olleak, H. El-Hofy (Egypt-Japan University of Science and Technology); M. N. A. Nasr (Alexandria University)
09:20	Use of Forming Limit Curve as a Failure Criterion in Maritime Crash Analysis B. Atli-Veltin, L. Vredeveltd (TNO)	Numerical Investigation of the Nozzle Number on the Performance of Conical Vortex Tube M. Guen, O. Imine, A. Miloud (University of Science and Technology of Oran Algeria)	LS-DYNA Air Blast Techniques: Comparisons with Experiments for Close-in Charges L. Schwer (Schwer Engineering); H. Teng (LSTC); M. Souli (University of Lille)	SPH Modeling of Cutting Forces while Turning of Ti6Al4V Alloy A. A. Olleak, H. El-Hofy (Egypt-Japan University of Science and Technology)
09:45	Non-Structural Mass Modeling in Aircraft Impact Analysis using Smooth Particle Hydrodynamics M. Kostov, M. Miloshev, Z. Nikolov, I. Klecherov (Risk Engineering)	Validation of Fluid Analysis Capabilities in LS-DYNA Based on Experimental Result S. Tokura (Tokura Simulation Research)	ALE/FSI AirBlast Modeling: On the Way to one Billion Elements N. Van Dorsselaer, V. Lapoujade (DynaS+)	Simulation of Circular Sawing Processes H. Vazquez Martinez (Fraunhofer IPA)
10:10	Break pp 83-92	Break pp 355-362	Break pp 279-290	Break pp 299-308
	CRASH VI – MATERIAL	MULTIPHYSICS II – CFD/FSI	SIMULATION IV – BLAST/PENETR.	SIMULATION VI – CRACKS
10:40	Chair: E. Mottola (Toyota Motor Europe)	Chair: T. Miyachi (JSOL)	Chair: M. Souli (University of Lille)	Chair: H. Chladek (InproSim)
11:05	Ductile Fracture Prediction with Forming Effects Mapping of Press Hardened Steels L. Knoerr, T. Faath, S. Sikora (Thyssen Krupp Steel NA); P. Woelke, B. Benowitz, B. Hiriyur (Weidlinger Associates)	Analysis of Unsteady Aerodynamics of a Car Model with Radiator in Dynamic Pitching Motion using LS-DYNA Y. Nakae, J. Takamitsu, H. Tanaka, T. Yasuki (Toyota Motor)	An Assessment of ALE Mapping Technique for Buried Charge Simulations I. Kurtoğlu (FNSS Savunma Sistemleri)	Three-Point Bending Crack Propagation Analysis of Beam Subjected to Eccentric Impact Loading by X-FEM T. Tsuda, Y. Ohnishi, R. Ohtagaki (Itochu Techno-Solutions); K. Cho, T. Fujimoto (Kobe University)
11:30	Probabilistic Analysis of Process Chain "Forming to Crash" Regarding Failure Prediction B. Özarmut, H. Richter (ThyssenKrupp Steel Europe); A. Brosius (Technical University Dresden)	Analysis of an Automobile Roof Panel under Strongly Coupled Fluid Structure Interaction using LS-DYNA D. Detwiler (Honda R&D Americas)	An Investigation of AA7075-T651 Plate Perforation Using Different Projectile Nose Shapes B. Balaban, İ. Kurtoğlu (FNSS Savunma Sistemleri)	Keep the Material Model Simple with Input from Elements that Predict the Correct Deformation Mode Prof. T. Tryland (Sintef Raufoss Manufacturing); T. Berstad (Norwegian University of Science and Technology)
11:55	Development of a Fully-Tabulated, Anisotropic and Asymmetric Material Model for LS-DYNA (*MAT_264) S. Haight, C.-D. Kan (George Mason University); P. Du Bois (Consultant)	Ground Vehicle Aerodynamics using LS-DYNA F. Del Pin, R. R. Paz, I. Caldichoury (LSTC)	Modeling of Ballistic Impact of Fragment Simulating Projectiles against Aluminum Plates T. Fras, L. Colard, B. Reck (French-German Research Institute of Saint-Louis)	Damping Modeling in Woven Lattice Materials S. Szyniszewski (University of Surrey); S. Ryan, S. Ha, Y. Zhang, T. Weihs, K. Hemker, J.K. Guest (The Johns Hopkins University Baltimore)
12:20	Comparison of Crash Models for Ductile Plastics B. Croop, M. Lobdell, H. Lobo (DatapointLabs)		Shock Response Analysis of Blast Hardened Bulkhead in Naval Ship under Internal Blast S.-G. Lee, H.-S. Lee, J.-S. Lee (Korea Maritime & Ocean University); Y. Y. Kim, G. G. Choi (Korea Advanced Institute of Science and Technology)	Solving of Crash Problems of the Fuel Supply Modules in the Fuel Tank M. Dobeš, J. Navrátil (Robert Bosch)
12:20	Lunch break			

PLENARY ROOM

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KEYNOTE PRESENTATIONS III – FAREWELL

	Chair: J. Jergesus (Volvo Car)
13:30	Under Body Vulnerability and Design Loads Prediction using LS-DYNA at Jaguar Land Rover P. Khapane (Jaguar Land Rover)
14:00	CAE and Testing Dreams for 2020 C. Lemaitre (Faurecia)
14:30	Joint Analytical/Experimental Constitutive and Failure Model Development P. Du Bois (Consultant); J. Seidt (Ohio State University)
15:00	Break Chair: T. Münz (DYNAmore)
15:25	Nonlinear Analysis 1980 - 2020 M. Lawson (Rolls-Royce)
15:55	Recent Developments in LS-DYNA – Part II B. Wainscott, J. O. Hallquist and other developers (LSTC)
16:45	Farewell

ROOM 5 pp 291-298

SIMULATION V – MATERIALS

Chair: S. Scalera (DYNAmore Italia)

Mechanical Response Modeling of Different Porous Metal Materials
Prof. M. Vesenjak, M. Borovinšek, A. Kovačič, M. Ulbin, Z. Ren (University of Maribor)

Development of a Tool for Automatic Calibration of Material Models in LS-DYNA
A. Mardalizad (Polytechnic University of Turin); E. Sadeghipour, M. Lienkamp (Technical University Munich)

Verification of the Part-Composite Approach for Modeling the Multi-Layered Structure of a Rolling Truck Tire
S. Shokouhfar, S. Rakheja (Concordia University); M. El-Gindy (UOIT)

pp 309-316

SIMULATION VII – DROP TEST/BIO

Chair: G. Laird (Predictive Engineering)
Drop Test Simulation and Verification of a Dishwasher Mechanical Structure in LS-DYNA
O. Mulkoglu, M. A. Guler (TOBB University of Economics and Technology); H. Demirbag (Arcelik)

Impact Simulations on Home Appliances to Optimize Packaging Protection: A Case Study on a Refrigerator
D. Hailoua Blanco, A. Ortalda (Enginsoft); F. Clementi (Electrolux Italia)

A Variable Finite Element Model of the Overall Human Masticatory System for Evaluation of Stress Distributions During Biting and Bruxism
S. Martinez, J. Lenz, Prof. K. Schweizerhof (Karlsruhe Institute of Technology); Prof. H. Schindler (University of Heidelberg)

ROOM 6 pp 395-402

DEVELOPER IV – MISC

Chair: J. Kennedy (KBS2)
LS-TaSC Product Status
K. Witowski, P. Schumacher (DYNAmore); W. Roux (LSTC)

Recent Developments for Thermo-Mechanically Coupled Simulations in LS-DYNA with Focus on Welding Processes
T. Klöppel (DYNAmore); T. Loose (Ingenieurbüro Tobias Loose)

Improvements to LS-DYNA Implicit Mechanics
 R. Grimes (LSTC)

MPP Contact: Options and Recommendations
 B. Wainscott (LSTC)

pp 403-410

DEVELOPER V – ELEMENTS

Chair: M. Langseth (Norwegian Univ.)
Edge-to-Edge Cohesive Shell Elements in LS-DYNA
J. Karlsson (DYNAmore Nordic); M. Fagerström (Chalmers University)

A New Feature to Model Shell-Like Structures with Stacked Elements
 T. Erhart (DYNAmore)

Isogeometric Analysis in LS-DYNA: Using CAD-Geometry for Numerical Simulation
 Prof. D. Benson (University of California), D. Bhalsod, P. Ho, L. Li, W. Li, A. Nagy, I. Yeh (LSTC); S. Hartmann (DYNAmore)

ROOM 7

WORKSHOP

Tutors: A. Fertschej, P. Reithofer, M. Rollant (4a Engineering); A. Förderer (DYNAmore)

Dynamics Plastic Material Characterization with the 4a/Impetus Pendulum

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

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ROOM 8

WORKSHOP

Tutor: A. Farahani (Engineering Technology Associates)

Sheet Metal Forming Simulation with eta/DYNAFORM

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WORKSHOP

Tutors: T. Loose (Ing.-büro Loose); T. Klöppel (DYNAmore)

Welding and Heat Treatment with LS-DYNA

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WORKSHOP

Tutor: C. Liebold (DYNAmore)

Modeling Composites in LS-DYNA

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 Jaguar
 Land Rover



C. Lemaitre
 Faurecia



P. Du Bois
 Consultant



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