CHS² 2017

6th International Conference on

HOT SHEET METAL FORMING OF HIGH-PERFORMANCE STEEL

4–7 JUNE 2017

ATLANTA, GA., USA

PROGRAM

LULEÅ UNIVERSITY OF TECHNOLOGY

UNIKASSEL VERSITÄT

AIST ASSOCIATION FOR IRON & STEEL TECHNOLOGY

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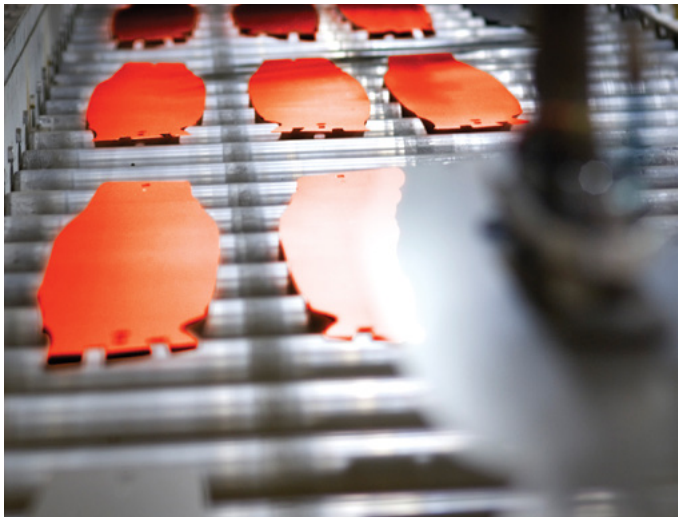

EXHIBITION HOURS

SUNDAY, 4 JUNE 2017

5–6:30 p.m.

MONDAY, 5 JUNE 2017

7:30 a.m.–5 p.m.

TUESDAY, 6 JUNE 2017

7:30 a.m.–5 p.m.

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PREFACE

PROMOTING RESEARCH, NETWORKING AND INNOVATION

The area of hot sheet metal forming of high-performance steel is under continuous development and the industrial and research community within this field is established all over the world. Since its innovation in Sweden in the 1970s, press hardening has become a global technology. The driving forces for this fast development, with focus on the automotive sector, are concern for the environment and passenger safety. Press hardening and related thermomechanical processes represent technologies with outstanding potential to meet global environmental challenges as well as the safety challenges within the transportation sector. What started as a niche technology has developed into a real mainstream area in lightweight design.

To fully support the potential of this technology, further innovations in press-hardening steel (PHS) technologies are essential. Research and development, both on academic as well as on the industrial level, is one of the most important prerequisites for continuing innovation.

The Swedish German Centre of Excellence for Hot Sheet Metal forming of High-Performance Steel — CHS^2 — the University of Kassel (Germany) and the Luleå University of Technology (Sweden) have established a unique worldwide competence network to meet the future challenges of hot sheet metal forming technology. Through the cooperation with Association for Iron & Steel Technology (AIST), this community is further strengthened in the North American region.

CONFERENCE SERIES AND SCOPE

The biannual CHS^2 conference series has, after five very successful conferences since 2008, grown into the leading platform for scientific exchange in PHS technology. The CHS^2 conference undoubtedly constitutes the most important event for the international scientific community in the field.

Consequently, for the 6th International Conference on Hot Sheet Metal Forming of High-Performance Steel 2017, specialists from all over the world are invited to join this unique exchange platform and to benefit from each other's experience and expertise. Topics like tailored properties, microstructure, material and product performance, new surface coatings and new steels for press hardening, as well as pertinent tribological aspects, will be in focus in the same way as thermal processing, monitoring, modeling, simulation, and, of course, new PHS part innovations and design principles.

CONFERENCE ORGANIZING COMMITTEE

Organizing Committee

- **Prof. Kurt Steinhoff**
  University of Kassel, Germany
- **Prof. Mats Oldenburg**
  Luleå University of Technology, Sweden
- **Prof. Braham Prakash**
  Luleå University of Technology, Sweden
- **Paul Belanger**
  Gestamp, USA
- **Dr. Constantin Chiriac**
  Ford Motor Co., USA
- **Dr. Jeff Wang**
  General Motors R&D, China
- **Brian Bliss**
  Association for Iron & Steel Technology (AIST), USA

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  Colorado School of Mines, USA
- **Prof. Kurt Steinhoff**
  University of Kassel, Germany
- **Dr. Ursula Weidig**
  University of Kassel, Germany
- **Prof. Michael Worswick**
  Waterloo University, Canada

Conference Secretary

- **Hans Åhlin (Abstract and Paper Submission)**
  Luleå University of Technology, Sweden
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- **Shannon Kiley (Organizational Tasks)**
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SCHEDULE OF EVENTS

SUNDAY, 4 JUNE 2017

4 p.m.	Registration
5–6:30 p.m.	Welcome Reception and Tabletop Displays

MONDAY, 5 JUNE 2017

7:30 a.m.	Registration, Breakfast and Exposition
8:30 a.m.	Opening Remarks
8:40 a.m.	Opening Speeches
9 a.m.	Technical Sessions
10 a.m.	Refreshment Break
10:20 a.m.	Technical Sessions
Noon	Lunch
1 p.m.	Technical Sessions
3:20 p.m.	Refreshment Break
3:40 p.m.	Technical Sessions
6:30 p.m.	Banquet Dinner at Georgia Aquarium

TUESDAY, 6 JUNE 2017

7:30 a.m.	Breakfast and Exhibition
8:20 a.m.	Technical Sessions
10 a.m.	Refreshment Break
10:20 a.m.	Technical Sessions
Noon	Lunch
1 p.m.	Technical Sessions
3:20 p.m.	Refreshment Break
3:40 p.m.	Technical Sessions
7 p.m.	Dinner

WEDNESDAY, 7 JUNE 2017

7:30 a.m.	Breakfast
8:20 a.m.	Technical Sessions
10 a.m.	Refreshment Break
10:40 a.m.	Technical Sessions
11:40 a.m.	Closing Session
Noon	Conference Adjourns

CONFERENCE PROGRAM

SUNDAY, 4 JUNE 2017

4 p.m.	**Registration**
5 p.m.	**Welcome Reception and Tabletop Displays**

MONDAY, 5 JUNE 2017

7:30 a.m.	**Registration, Breakfast and Exposition**
8:30 a.m.	**Opening Remarks** *Prof. Mats Oldenburg, Prof. Braham Prakash, Luleå University of Technology*
8:40 a.m.	**Opening Speech** *Ignacio Martin, R&D general director BIW, Gestamp*

	Session A1: Modeling & Simulation I	**Session B1: Heating Technology I**
9 a.m.	**Fracture Mechanics–Based Modeling of Failure in Advanced High-Strength Steels** *P. Jonsén, S. Golling, D. Frómeta, D. Casellas, M. Oldenburg, Luleå University of Technology*	**Energy-Efficient Heating for Hot Stamping** *S. Mickey, M. Schoenfelder, J. Wuenning, WS Thermal Process Technology Inc.*
9:20 a.m.	**An Anisotropic Thermo-Elasto-Viscoplastic Model Fully Coupled With Isotropic Damage for Hot Sheet Metal Forming** *K. Zhang, H. Badreddine, K. Saanouni, University of Technology of Troyes*	**Development of an Energy-Efficient Burner for Heat Treatment Furnaces With a Reducing Gas Atmosphere** *J. Wünning, E. Cresci, J. Schneider, N. Schmitz, S. Schwotzer, H. Pfeifer, WS Wärmeprozesstechnik GmbH*
9:40 a.m.	**A Comparative Study of Different Failure Modeling Strategies on a Laboratory-Scale Test Component** *S. Golling, R. Östlund, M. Schill, R. Sjöblom, K. Mattiasson, J. Jergeus, M. Oldenburg, Luleå University of Technology*	**Investigation on Influence of Resistance Heating on Mechanical Properties and Surface Quality of Hot-Stamped Part of High-Strength Steel** *Y. Wang, W. Liang, Y. Liu, B. Zhu, Y. Zhang, Huazhong University of Science & Technology*
10 a.m.	**Refreshment Break**	

	Session A2: Materials & Metallurgy I	Session B2: Coatings I & Special Processes
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11 a.m.	**Warm Tensile Deformation and Stamping of Medium-Mn TRIP Steels Microalloyed With Molybdenum and Niobium** *M. Cai, H. Pan, H. Huang, H. Ding, Y. Zhang, B. Rolfe, P. Hodgson, Northeastern University*	**Lamellar Structure Formation of Hot-Stamped Galvannealed Coating During Tempering** *A. Sengoku, H. Takebayashi, N. Okamoto, H. Inui, Nippon Steel Sumitomo Metal Corp.*
11:20 a.m.	**Study on Bendability of Hot-Press-Forming Steel With Nb or Nb-V Added** *S. Leifeng, L. Hongzhou, Z. Jia, M. Mingtu, China Automotive Engineering Research Institute Co. Ltd.*	**Development of New Al Coating for Press Hardening** *J. Oh, S. Kim, Y. Cho, I. Suh, POSCO*
11:40 a.m.	**A Fracture Mechanics Approach to Develop High-Crash-Resistant Microstructures by Press Hardening** *D. Casellas, D. Frómeta, T. Lara, S. Molas, P. Jonsém, S. Golling, M. Oldenburg, Fundacio CTM Centre Tecnologic*	**Profile-Like Hot-Formed UHSS Components Utilizing FBH Technology — An Alternative Approach to Conventional Hot Stamping** *D. Fuss, W. Schmidt, K. Werner, E. Danger, Linde + Wiemann GmbH KG*
Noon	**Lunch**	

	Session A3: Joining & Welding I	Session B3: Failure Mechanism I
1 p.m.	**Processing of Coated Manganese Boron Steel: Joining Is the Key!** *T. Manzenreiter, M. Rosner, voestalpine Steel Division*	**Influence of Nb and Mn Contents on Resistance to Delayed Fracture of Ultrahigh-Strength Hot-Stamped Steel Sheets** *T. Kishimoto, Y. Takemoto, T. Senuma, Okayama University*
1:20 p.m.	**Crash Performance of Magnetic Pulse-Welded High-Strength Steel-Aluminum Connections** *A. Rebensdorf, S. Boehm, University of Kassel*	**Identified Influencing Factors to Control to Remove Any Hydrogen-Induced Delayed Fracture Risk on Usibor® 1500 Parts** *C. Georges, S. Thierry, P. Drillet, J. Mataigne, D. Cornette, ArcelorMittal Global R&D*

1:40 p.m.	**Monitoring of PHS Joining Quality With Non-Destructive Testing (NDT)** *C. Conrad, B. Straß, B. Wolter, Fraunhofer IZFP*	**Liquid Metal Embrittlement During Hot Press Forming of Coated Press-Hardening Steel** *B. Cooman, W. Jung, L. Cho, K. Jo, S. Kang, Pohang University of Science and Technology*
2 p.m.	**Novel Alloys and Processing Methods to Produce Self-Pierce Rivets Capable of Joining 22MnB5 Press-Hardened Steel and Al6111** *S. Van Hall, K. Findley, A. Freis, Colorado School of Mines*	**Influence of Alloy Modifications and Microstructure on Properties and Crash Performance of Press-Hardened Steel Components** *H. Mohrbacher, NiobelCon bvba*

	Session A4: High-Temperature Tribology I	**Session B4: Tools & Dies**
2:20 p.m.	**High Temperature Tribological Behavior of Thermal-Spray Coated Tool Steels Sliding Against Al-Si Coated Ultrahigh-Strength Steel** *L. Pelcastre, J. Hardell, I. Heikkila, B. Prakash, Luleå University of Technology*	**A Novel Tooling Technology for Hot Forming Processes** *P. Åkerström, Luleå University of Technology*
2:40 p.m.	**Investigation of Partial Tribological Conditions Within Hot Stamping** *P. Schwingenschlögl, J. Steiner, K. Andreas, M. Merklein, Institute of Manufacturing Technology Friedrich-Alexander-Universität Erlangen-Nürnberg*	**Metallurgical Optimization of Tool Steels For Hot-Stamping Press Dies** *F. Hippenstiel, H. Mohrbacher, NiobelCon bvba*
3 p.m.	**Refreshment Break**	

	Session A5: Modeling & Simulation II	**Session B5: Materials & Metallurgy II**
3:40 p.m.	**Determination of the Essential Work of Fracture at High Strain Rates** *S. Golling, D. Frometa, D. Casellas, P. Jonsén, J. Granström, M. Oldenburg, Luleå University of Technology*	**Effect of Cooling Rate Below Martensite Start Temperature on Yield Strength of Hot-Stamped Steel Sheet** *S. Tabata, K. Kusumi, K. Hikida, Nipon Steel & Sumitomo Metal Corp.*

4 p.m.	**Parametric FEA-Study on the Impact of Cooling Channel Design on Final Part Quality** *T. Brenne, M. Düring, M. Stippak, AutoForm Engineering Deutschland GmbH*	**A Model for Quenching and Partitioning With Press Hardening of High-Strength Steel** *Z. Liu, B. Zhu, Y. Wang, Y. Zhang, M. Cai, H. Ding, B. Rolfe, Y. Wang, Huazhong University of Science & Technology*
4:20 p.m.	**A Comparison Between Stepwise Modelling and Inverse Modeling Methods for Characterization of Press-Hardened Sheet Metals** *S. Marth, H. Häggblad, M. Oldenburg, Luleå University of Technology*	**Technological Properties of Conventional and Optimized Press-Hardening Steels** *M. Maikranz-Valentin, Salzgitter Mannesmann Forschung GmbH*
4:40 p.m.	**Advances in the Application of the Boundary Element Method to the Thermal Analysis of Hot Stamping Tools Considering Solid-to-Solid Heat Transfer** *W. Weiß, B. Suhr, M. Koplenig, J. Graf, Virtual Vehicle Research Center*	
5 p.m.	**End of Day 1**	
6:30 p.m.	**Banquet Dinner at Georgia Aquarium**	

TUESDAY, 6 JUNE 2017

7:30 a.m.	**Breakfast and Exhibition**

	Plenary Session A6: Coatings II
8:40 a.m.	**New Zn Multi-Step Hot Stamping Innovation at Gestamp** *P. Belanger, M. Lopez Lage, K. Isaksson, Gestamp North America*
9 a.m.	**Hot Forming of Zinc-Coated Press-Hardening Steel: Characterization of Forming Behavior and New Process Routes for Mass Production** *R. Kelsch, K. Radlmayr, A. Sommer, H. Schwinghammer, T. Kurz, G. Lukeneder, J. Faderl, voestalpine Polynorm GmbH & Co. KG*
9:20 a.m.	**The Effect of Hot-Press-Forming Process Parameters on Coating Layer Behavior of Al-Si-Coated Steel** *H. Kim, H. Son, J. Choi, POSCO*

9:40 a.m.	**Material Properties of Zinc-Coated Press-Hardening Steels for Use With Pre-Cooling Technology** *T. Kurz, T. Steck, H. Schwinghammer, P. Larour, voestalpine Stahl GmbH*
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	Session A7: Heat Treatment	Session B6: Failure Mechanism II
10:40 a.m.	**The Effects of the Heating Rate and the Incoming Microstructure on the Phase Transformation Temperatures of 22MnB5 Steel** *C. Chiriac, R. Sohmshetty, Ford Motor Co.*	**Hydrogen in Hot Forming Steels — Mechanisms and Coating Design** *J. Banik, U. Etzold, N. Rössler, N. Ruthenberg, thyssenkrupp Steel Europe AG*
11 a.m.	**Effect of Austenitizing Parameters on Double Edge Notch Tensile Properties of Press-Hardened Steel** *L. Golem, K. Findley, T. Brown, P. Belanger, J. Speer, Colorado School of Mines*	**Hydrogen Absorption and Desorption Kinetics During Hot Press Forming of Aluminized and Zn-Coated Press-Hardening Steel** *R. Jo, S. Dimas, L. Cho, B. De Cooman, S. Kim, Pohang University of Science and Technology*
11:20 a.m.	**Influence of Phase Transformation on the 22MnB5 Formability in Hot Stamping** *G. Venturato, M. Novella, S. Bruschi, A. Ghiotti, University of Padova*	**Atom Probe Study of Prior Austenite Grain Boundaries of Zinc-Coated Press-Hardened Steel** *C. Hofer, T. Kurz, H. Clemens, R. Schnitzer, Montanuniversität Leoben*
11:40 a.m.	**Intercritical Annealing — New Heat Treatment Strategies for Tailoring the Stress-Strain Behavior of 22MnB5** *L. Wolf, D. Rodman, F. Nürnberger, J. Cordebois, H. Maier, Institut für Werkstoffkunde, Leibniz Universität Hannover*	**A Coupled Micromechanical-Phenomenological Approach to Predict Fracture in Boron Steel** *P. Samadian, M. Worswick, M. Wells, University of Waterloo*
Noon	**Lunch**	

	Session A8: Tailored Properties I	Session B7: High-Temperature Tribology II
1:20 p.m.	**Tailoring by Direct Contact Heating During HFDQ** *N. Field, M. Di Ciano, A. Gerlich, M. D'Souza, K. Daun, University of Waterloo*	**Investigations of the Adhesive Wear Behavior of Alloyed and Not-Alloyed Hot-Stamping Tools in Contact With 22MnB5** *F. Neubauer, J. Steiner, K. Andreas, M. Merklein, Lehrstuhl für Fertigungstechnologie*

1:40 p.m.	**Hot-Formed Tailor-Rolled Products, Lightweight Solutions With Tailored Properties for Modern Vehicle Structure** *B. Göddeke, J. Brecht, N. Teipel, Mubea Tailor Rolled Blanks GmbH*	**A Tribological Test Series Under Press-Hardening Conditions for Galling Research** *L. Deng, L. Pelcastre, J. Hardell, B. Prakash, M. Oldenburg, Luleå University of Technology*
2 p.m.	**Tool and Process Design for Press-Hardened Parts With Small-Sized Tailored Properties** *N. Pierschel, D. Landgrebe, K. Sibermann, F. Schieck, Fraunhofer Institute for Machine Tools and Forming Technologies IWU*	**Influence of Die Temperature on the Tribological Response During Interaction With Al-Si Coated UHSS** *L. Pelcastre, J. Hardell, B. Prakash, Luleå University of Technology*

	Session A9: Heating Technology II	**Session B8: Process Monitoring**
2:20 p.m.	**Challenges in Heat Treatment for Press Hardening** *H. Lehmann, schwartz GmbH*	**Integrated Manufacturing Quality Control for Press-Hardening Steel** *M. Peintinger, C. Wood, QuinLogic GmbH*
2:40 p.m.	**In-Furnace Tailored Hot Stamping With Selective Austenitizing by Radiant Heating Design** *E. Ota, Y. Yogo, Toyota Central R&D Labs. Inc.*	**Thermographic Process Monitoring — Influences and Importance of Different Parameters for Temperature Control in Press-Hardening** *S. Sturm, InfraTec GmbH*
3 p.m.	**Advanced Design of Continuous Roller Furnace for Hot Forming Line** *J. Tawk, B. Dvorak, T. Vit, I. Libdeh, Benteler Maschinenbau GmbH*	**A Smart Processes Control Strategy for Press-Hardening Production** *L. Wang, B. Zhu, Y. Zhang, Y. Wang, X. An, Q. Wang, Huazhong University of Science and Technology*
3:20 p.m.	**Refreshment Break**	

	Session A10: Materials & Metallurgy III	**Session B9: Joining & Welding II & Laser Application**
4 p.m.	**Ductibor 1000® AlSi: A New PHS Development for a Crash Ductility Optimization** *S. Sarkar, P. Drillet, M. Beauvais, N. Ramisetti, L. Dormegny, ArcelorMittal Global R&D*	**Investigation of Resistance Spot Weld Fracture in Hot-Stamped Steels** *C. O'Keeffe, C. Butcher, M. Worswick, S. Malcolm, J. Dykeman, P. Penner, C. Yau, E. Biro, R. Soldaat, W. Bernert, University of Waterloo*

4:20 p.m.	**Metallurgical Solutions to Improve Bending and Crash Performance of Press-Hardening Steels** *J. Bian, H. Lu, W. Wang, A. Guo, Niobium Tech Asia*	**The Effect of Welding Spot Arrangement on the Energy Absorption of Hot-Stamped Patchwork B-Pillar** *C. Chiu Huang, S. Wang, P. Lee, T. Chen, H. Liou, Y. Chen, P. Cheng, China Steel Corp.*
4:40 p.m.	**Lightweight Chassis Parts Made of MaX1.2HY Press-Hardening Stainless Steel** *J. Moreau, G. Badinier, P. Santacreu, B. Petit, J. Mithieux, J. Paegle, Aperam Research Center*	**High Flexibility in Partial Laser Softening of Press-Hardened Steel** *M. Schaefer, P. Scheible, F. Spitz, T. Harrer, TRUMPF Laser- und Systemtechnik GmbH*
5 p.m.	**End of Day 2**	
7 p.m	**CHS² Dinner**	

WEDNESDAY, 7 JUNE 2017

7:30 a.m.	**Breakfast**

	Session A11: Hot Stamping of Light Metals	**Session B10: Parts & Processes**
8:20 a.m.	**Investigations on Aluminum Hot and Warm Forming With the Help of Virtual Process Modeling** *M. Vrolijk, C. Koroschetz, M. Holecek, K. Snilsberg, L. Jönsson, D. Lorenz, ESI Group*	**Innovative Solutions for an Effective Hot Stamping** *M. Gharbi Mohammad, Schuler Pressen GmbH*
8:40 a.m.	**An Experimental Investigation of Hot-Forming Effects on Mechanical Properties of High-Strength Aluminum Alloys AA6082 and AA7075** *E. Scharifi, D. Kuhnhenn, A. Ademaj, U. Weidig, Metal Forming Technology, University of Kassel*	**Predictive Approach for Crash Performance of Press-Hardened Steels and Its Application on New Product Developments** *P. Dietsch, K. Tihay, S. Cobo, S. Sarkar, D. Hasenpouth, D. Cornette, ArcelorMittal Global R&D*
9 a.m.	**Forming With Thermomechanical Treatment for Manufacturing a Side Sill Demonstrator of AA6082 Aluminum Sheet Alloy** *E. Meza García, A. Rautenstrauch, A. Leonhardt, V. Kräusel, D. Landgrebe, Technische Universitaet Chemnitz*	**Investigation on the Hot Bending of 22MnB5 Tubes** *E. Simonetto, A. Ghiotti, S. Bruschi, University of Padua*

9:20 a.m.	**Investigation on Short-Time Aging of Al-Mg-Si Alloy Sheet Under Hot-Stamping Conditions** *Y. Liu, Z. Zhu, Z. Wang, B. Zhu, Y. Wang, Y. Zhang, H. Ding, M. Cai, Huazhong University of Science & Technology*	**Sheet Metal Forming in Progressive Dies Assisted by Rapid Induction Heating: Setting of Springback and Product Properties** *C. Löbbe, L. Hiegemann, A. Tekkaya, S. Hater, M. Kamaliev, Institute of Forming Technology and Lightweight Construction*
9:40 a.m.	**Optimization of Thermomechanical Forming Analysis for Aluminum-Alloy Sheet** *B. Ghoo, Y. Umezu, JSOL Corp.*	**Comparison of Corrosion Resistance of 1500 MPa Grade Hot-Stamped Cold-Rolled and Hot-Rolled (CSP) Press-Hardening Steels for Automotive Application** *H. Peng, X. Mao, X. Huang, J. Song, T. Pang, Y. Ma, H. Wang, K. Hu, S. Wang, Research and Development Center of Wuhan Iron and Steel (Group) Corp.*
10 a.m.	**Refreshment Break**	

	Session A12: Tailored Properties III	**Session B11: Materials & Metallurgy IV**
10:40 a.m.	**Numerical Modeling of the Crash Performance of Tailored Hot-Stamped Crush Rails** *C. Peister, M. Worswick, K. Omer, S. Malcolm, J. Dykeman, C. Yau, R. Soldaat, W. Bernert, University of Waterloo*	**Effect of Microstructure on Impact Toughness of Press-Hardening Steels With Tensile Strength Exceeding 1.8 GPa** *J. Wang, Y. Liu, Q. Lu, J. Pang, Z. Wang, C. Enloe, J. Singh, C. Horvath, General Motors Global Research and Development*
11 a.m.	**Damage Characterization of Tailored Hot Stampings** *A. Bardelcik, C. Vowles, University of Guelph*	**Uncoated Press-Hardened Steel Alloys With Improved Residual Ductility** *A. Roubidoux, AK Steel Research and Innovation*
11:20 a.m.	**Analyzing the Forming Behavior of Transition Areas of Partial Press-Hardened Steel at High Strain Rates** *N. Weiß-Borkowski, T. Marten, T. Tröster, A. Schulz-Beenken, University of Paderborn, Lehrstuhl für Leichtbau im Automobil*	**Impact Toughness of Medium-Mn Steel After Hot Stamping** *Q. Lu, J. Wang, Y. Liu, Z. Wang, L. Wang, General Motors Global Research and Development*
11:40 a.m.	**Closing Session**	
Noon	**Conference Adjourn**	

EXHIBITORS

- **Aichelin Holding GmbH** . . . . . Booth #16
- **EBNER Furnaces Inc.** . . . . . Booth #13
- **Infratec Infrared LLC** . . . . . Booth #5
- **Macrodyne Technologies Inc.** . . . . . Booth #12
- **Quaker** . . . . . Booth #4
- **QuinLogic LLC** . . . . . Booth #10
- **Schuler** . . . . . Booth #15
- **schwartz GmbH** . . . . . Booth #3
- **Telos Global** . . . . . Booth #8
- **TRUMPF** . . . . . Booth #9
- **WS Thermal Process Technology** . . . . . Booth #11

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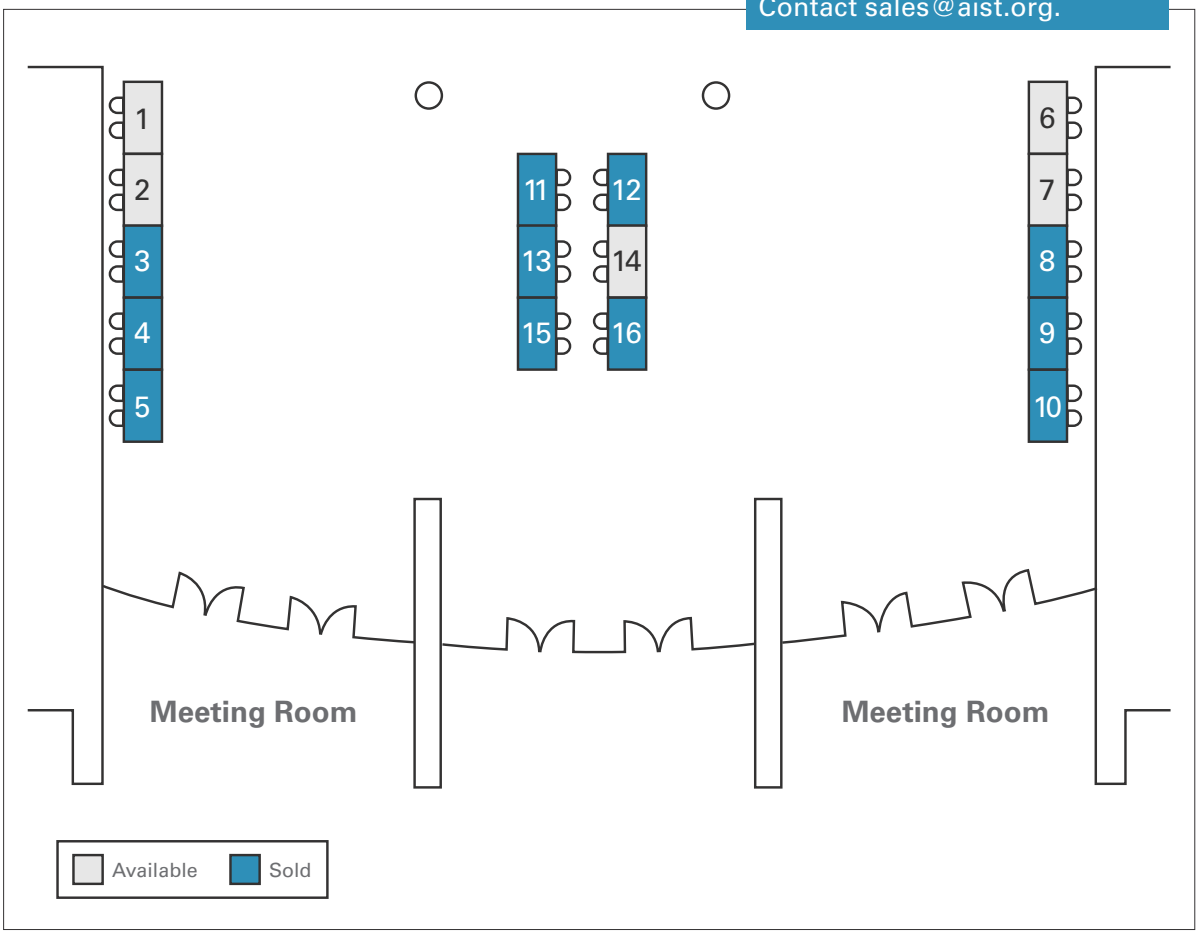

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