NUMISHEET 2018

The 11th International Conference and Workshop
on Numerical Simulation of 3D Sheet Metal Forming Processes
30 July – 3 August 2018, Tokyo, Japan

PROGRAM AND ABSTRACTS

EDITORS

Toshihiko Kuwabara (Chair)	Tokyo Univ. Agriculture & Technology
Takayuki Hama (Co-Chair)	Kyoto University
Mitsutoshi Kuroda (Co-Chair)	Yamagata University
Susumu Takahashi (Co-Chair)	Nihon University
Akinori Yamanaka (Secretary)	Tokyo Univ. Agriculture & Technology

NISSEI EBLO INC.
5-20-4 SHINBASHI, MINATO-KU, TOKYO 105-0004 JAPAN

Printed in Japan

TABLE OF CONTENTS

ORGANIZATION OF NUMISHEET 2018

CHAIRMAN	Toshihiko Kuwabara (Tokyo Univ. Agriculture & Technology, Japan)
CO-CHAIRMAN	Takayuki Hama (Kyoto University, Japan)
	Mitsutoshi Kuroda (Yamagata University, Japan)
	Susumu Takahashi (Nihon University, Japan)
GENERAL SECRETARY	Akinori Yamanaka (Tokyo Univ. Agriculture & Technology, Japan)

STEERING COMMITTEE

Cardoso, R. (UK)
Hora, P. (Switzerland)
Pourboghrat, F. (USA)
Stoughton, T. B. (USA)
Wagoner, R. H. (USA)
Yang, D. Y. (Korea)
Yoon, Jeong Whan (Australia)

INTERNATIONAL SCIENTIFIC COMMITTEE

Aretz, H. (Germany)
Balan, T. (France)
Banabic, D. (Romania)
Barlat, F. (Korea)
Cao, J. (USA)
Cazacu, O. (USA)
Cesar de Sa, J. (Portugal)
Chen, J. (China)
Chen, F.-K. (Taiwan)
Chung, W.-J. (Korea)
Coppieters, S. (Belgium)
Dick, R.E. (USA)
Green, D. (Canada)
Habraken, A.M. (Belgium)
Huh, H. (Korea)
Iadicola, M. (USA)
Inal, K. (Canada)
Khan, A.S. (USA)
Kim, Y.S. (Korea)
Kinsey, B. (USA)
Korhonen, A.S. (Finland)
Korkolis, Y.P. (USA)
Kyriakides, S. (USA)
Lee, M.G. (Korea)
Li, X. (China)
Lin, J. (UK)
Manach, P.Y. (France)
Martins, P. (Portugal)
Massoni, E. (France)
Merklein, M. (Germany)
Mohr, D. (Switzerland)
Mulder, H. (Netherlands)
Narasimhan, K. (India)
Ofenheimer, A. (Austria)
Ponthot, J.P. (Belgium)
Reddy, V. (India)
Shi, M. (USA)
Steglich, D. (Germany)
Takizawa, H. (Japan)
Tekkaya, A. E. (Germany)
Thuillier, S. (France)
Tisza, M. (Hungary)
van den Boogaard, A.H. (Netherlands)
Volk, W. (Germany)
Worswick, M. (Canada)
Wu, P. (Canada)
Yoshida, F. (Japan)
Yoshida, K. (Japan)
Zhang, S.-H. (China)

LOCAL ORGANIZING COMMITTEE

Tsuyoshi Furushima (The University of Tokyo)
Hiroshi Hamasaki (Hiroshima University)
Kunio Hayakawa (Shizuoka University)
Eiji Iizuka (JFE Steel Corporation)
Takashi Iizuka (Kyoto Institute of Technology)
Takuya Kobayashi (Mechanical Design & Analysis Corporation)
Kazutake Komori (Daido University)
Ninshu Ma (Osaka University)
Yasushi Maeda (KOBE STEEL, LTD.)
Takashi Matsuno (Tottori University)
Takeshi Nishiwaki (Daido University)
Tetsuo Oya (Keio University)
Hideo Takizawa (Nippon Institute of Technology)
Hisashi Takizawa (AutoForm Japan K.K.)
Hideo Tsutamori (Daido University)
Takeshi Uemori (Okayama University)
Hiroshi Utsunomiya (Osaka University)
Jun Yanagimoto (The University of Tokyo)
Ming Yang (Tokyo Metropolitan University)
Shigeru Yonemura (Nippon Steel & Sumitomo Metal Corporation)
Kengo Yoshida (Shizuoka University)
Yoshinori Yoshida (Gifu University)
Nobuki Yukawa (Nagoya University)

BENCHMARK COMMITTEE

BM1 Toshihiko Kuwabara (Chairman, Tokyo Univ. Agriculture & Technology, Japan)
Tomoyuki Hakoyama (Co-Chairman, Gifu University, Japan)
Taiki Maeda (Tokyo Univ. Agriculture & Technology, Japan)
Chiharu Sekiguchi (Tokyo Univ. Agriculture & Technology, Japan)

BM2 Tomokage Inoue (Chairman, Aisin AW Industries Co., Ltd., Japan)
Hideo Takizawa (Co-Chairman, Nippon Institute of Technology, Japan)
Toshihiko Kuwabara (Tokyo Univ. Agriculture & Technology, Japan)
Shunya Nomura (Tokyo Univ. Agriculture & Technology, Japan)

BM3 Kengo Yoshida (Chairman, Shizuoka University, Japan)
Hiroshi Utsunomiya (Co-chair, Osaka University, Japan)
Keiji Amano (Mitsubishi Aluminum, Japan)
Hideaki Fukumasu (Mitsubishi Aluminum, Japan)
Takeshi Handa (Nippon Light Metal Company, Ltd., Japan)
Takeshi Ichikawa (Kobe Steel, Japan)
Yuji Kume (Yamagata University, Japan)
Toshihiko Kuwabara (Tokyo Univ. Agriculture & Technology, Japan)
Noa Miyake (Tokyo University of Agriculture and Technology, Japan)
Yoshihiko Moriyama (Nippon Light Metal Company, Ltd., Japan)
Shinichi Nishida (Gunma University, Japan)
Osamu Noguchi (UACJ Corporation, Japan)
Takeo Sakurai (Kobe Steel, Japan)
Hideo Takizawa (Nippon Institute of Technology, Japan)
Shinya Tamehiro (Kobe Steel, Japan)
Tomofumi Tsuji (Shizuoka University, Japan)
Tsuyoshi Yamamoto (Showa Denko, Japan)
Akinori Yamanaka (Tokyo Univ. Agriculture & Technology, Japan)

OPENING TIME OF THE REGISTRATION DESK (1ST FLOOR)

July 29, Sunday	17:00 to 19:00
July 30, Monday	7:30 to 21:00
July 31, Tuesday	7:30 to 18:30
Aug 1, Wednesday	7:30 to 17:40
Aug 2, Thursday	7:40 to 19:00

WiFi ACCESS

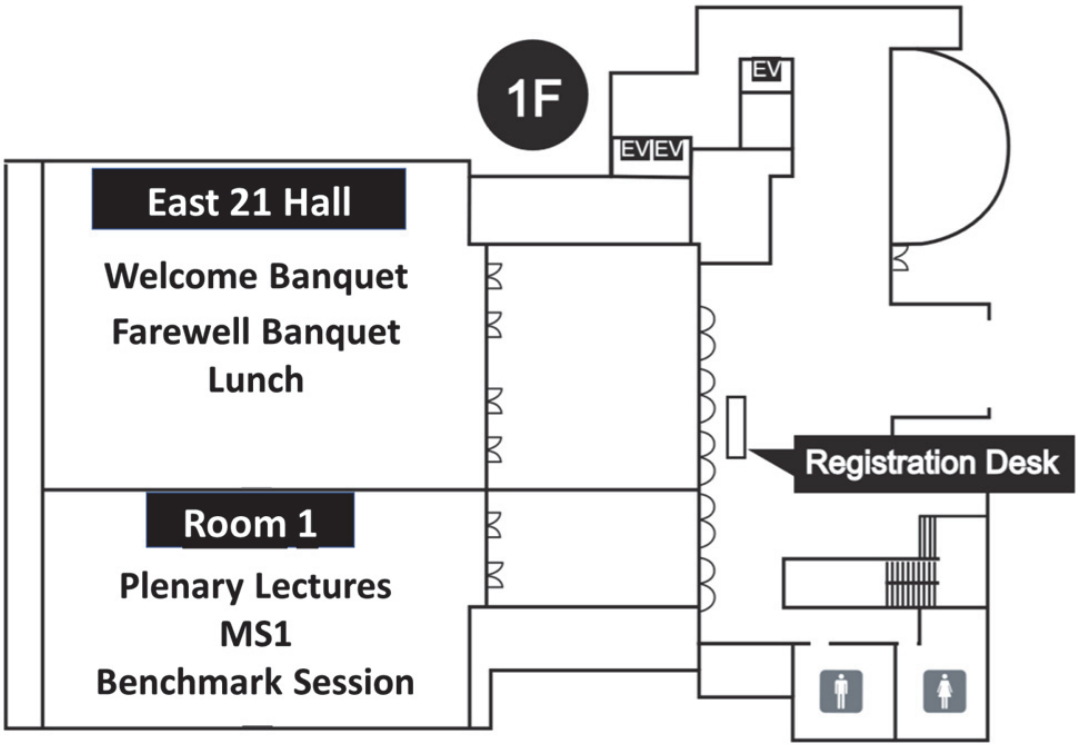
Free wireless internet access will be available throughout the conference venue as follows:

Room	SSID	PW
East 21 Hall (1F)	East21_Hall	east5683h
Robby (2F, 3F)	East21_Public	east5683p
Room 2, 3, 4 (3F)	East21_Eitai	east5683e
Room 5, 6 (3F)	East21_Toyo	east5683t
Botan (3F)	East21_Small_banquet	east5683s

PHOTOGRAPHY AND AUDIO/VIDEO RECORDING POLICY

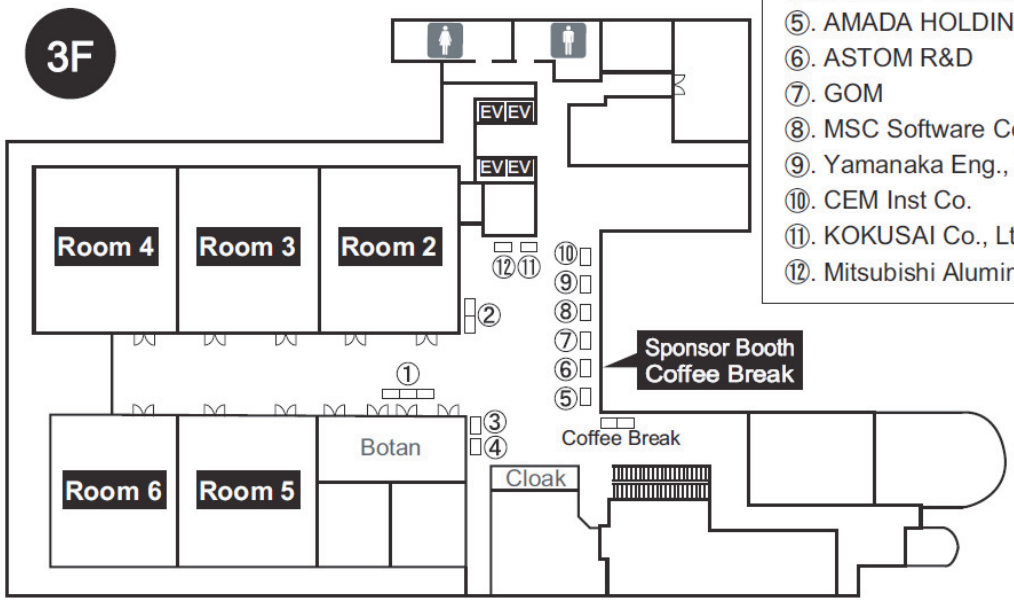
Any recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of the individual authors is strictly prohibited. No photos are to be taken of any presenter's slides. Attendees violating this policy may be asked to leave the session or the meeting without refund.

Floor Plan



Sponsor Booth

① AutoForm Engineering GmbH
② JSOL Corporation
③ Altair Engineering, Inc.
④ ITOCHU Techno-Solutions Corporation
⑤ AMADA HOLDINGS CO.,LTD.
⑥ ASTOM R&D
⑦ GOM
⑧ MSC Software Corporation
⑨ Yamanaka Eng., Co., Ltd.
⑩ CEM Inst Co.
⑪ KOKUSAI Co., Ltd.
⑫ Mitsubishi Aluminum Co., Ltd.



Conference Program

MON, July 30

ROOM		Room 1					
8:30	9:20	Industrial plenary lecture: **Bart Carleer**, *AutoForm Engineering* **Effective Stamping Simulations along the Sheet Metal Process Chain**					
9:20	10:10	Academic plenary lecture: **Frédéric Barlat**, *Pohang University of Science and Technology (POSTECH)* **Advanced Constitutive Modeling and Application in Sheet Forming**					
10:10	10:40	Coffee Break					
ROOM		**Room 1**	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
Session Title		**Kwansoo Chung Memorial Symposium I: Mechanics in Materials Forming**	**Advanced Material Characterization Using DIC and Inverse Methods I**	**Forming of HCP Metals I**	**Advances in Multiscale-Modeling of the Effect of Anisotropy in Forming I**	**Analysis of Sheet Metal Joining and Welding Phenomena I**	**Material Modelling for Sheet Metal Forming Simulations I**
Chair		**M.-G. Lee**	**S. Coppieters**	**T. Hama**	**F. Barlat**	**N. Ma**	**F. Yoshida**
10:40	11:10	MS1-1: Keynote	MS3-1: Keynote	MS4-1: Keynote	MS5-1: Keynote	MS7-1: Keynote	MS9-1: Keynote
		An Integrated computational materials engineering approach for constitutive modelling of 3rd generation advanced high strength steels	Inverse Yield Locus Identification using a biaxial tension apparatus with link mechanism and displacement fields	Prediction of the torsional response in HCP metals	Yield locus prediction using statistical and RVE-based fast Fourier transform crystal plasticity models and validation for drawing steels	Simulation of fatigue crack growth in weld joint of thin structures using characteristic tensor	A discussion of the associated flow rule based on the FAY model and Nakajima tests
11:10	11:30	MS1-2	MS3-2	MS4-2	MS5-2	MS7-2	MS9-2
		Stress update algorithm based on finite difference method and its application to homogenous anisotropic hardening (HAH) model	Development of new experimental test for sheet metals through-thickness behavior characterization	A mechanism-driven plasticity model for deformation by glide and twinning and its application to magnesium alloys	Anisotropic yield criteria	The corrosion behavior of cold spray coating on 2219 aluminium alloy joints prepared by friction stir welding	Effect of the plasticity model on the yield surface evolution after abrupt strain-path changes
11:30	11:50	MS1-3	MS3-3	MS4-3	MS5-3	MS7-3	MS9-3
		Effect of ideal flow conditions on springback	Application of the Virtual Fields Method to determine dynamic properties at intermediate strain rates	Crystal plasticity analysis of anisotropic deformation behavior of porous magnesium with oriented pores	Study on the influence of orthotropy and tension–compression asymmetry of metal sheets in springback and formability predictions	Study on keyhole and melt flow behaviors of laser welding of aluminum under reduced ambient pressures	A numerical scheme of convex yield function with continuous anisotropic hardening based on non-associated flow rule in FE analysis of sheet metal
11:50	12:10	MS1-4			MS5-4	MS7-4	MS9-4
		Mechanical Performance of Resistance Spot Welded Steel Sheets			Plastic deformation of metallic materials during dynamic events	Effect of different coatings on the weldability of Al to steel	On the certification of positive and convex Gotoh's fourth-order yield function
12:10	13:30	**Lunch**					

ROOM		Room 1					
13:30	14:10	Industrial plenary lecture: **Shinichiro Ohsawa**, *Toyota Motor Corporation* **Recent Applications and the Future Direction of Stamping Simulation in Toyota Motor Co.**					
14:10	14:30	Short Coffee Break					
Session Title		**Kwansoo Chung Memorial Symposium II: Mechanics in Materials Forming**	**Advanced Material Characterization Using DIC and Inverse Methods II**	**Forming of HCP Metals II**	**Advances in Multiscale-Modeling of the Effect of Anisotropy in Forming II**	**Analysis of Sheet Metal Joining and Welding Phenomena II**	**Material Modelling for Sheet Metal Forming Simulations II**
Chair		**J. H. Kim**	**M. Rossi**	**D. Steglich**	**A. Van Bael**	**H. Murakawa**	**T. Uemori**
14:30	15:00	MS1-5: Keynote	MS3-4: Keynote	MS4-4: Keynote	MS5-5: Keynote	MS7-5: Keynote	MS9-5: Keynote
		Thermomechanical Simulations of Blanking Process Operated over a Wide Range of Punch Velocities	Enhancing the hydraulic bulge-test using full-field DIC data	Slip activity in a CP-Ti oligocrystal: numerical study and comparison with experiments	Prediction of four, six or eight ears in drawn cups of single-crystal aluminum sheets	Simulation of welding thermal conduction and thermal stress using hybrid method of accelerated explicit and implicit FEM	Description of non-linear unloading curve and closure of cyclic stress-strain loop based on Y-U model
15:00	15:20	MS1-6	MS3-5	MS4-5	MS5-6	MS7-6	MS9-6
		Determination of forming limits of high strength sound-deadening laminated sheet	Prediction of mechanical properties on large diameter welded pipes through advanced constitutive modelling	Effect of deformation twinning on forming limit analysis of polycrystalline magnesium	On the usage of a grain size sensitive crystal plasticity model in the spectral solver framework	Numerical simulation of thermal supported self-pierce riveting of an ultra high-strength aluminium alloy	Finite element calculations of hole expansion in a thin steel sheet with polynomial yield functions of four and six degrees
15:20	15:40	MS1-7	MS3-6	MS4-6	MS5-7	MS7-7	MS9-7
		Modelling transient behavior during stress relaxation	Verification of accuracy of yield functions of sheet steels under shear strains in uniaxial tensile tests in multiple directions	Experimental and numerical study of the inelastic behavior of magnesium alloys during cyclic loading-unloading	Prediction of negative bulge in two point incremental forming of an asymmetric shape part	Numerical simulation and analysis of metal fused coating forming	High accuracy springback simulation by using material model considering the SD effect
15:40	16:00	MS1-8			MS5-8	MS7-8	MS9-8
		Numerical study of incremental sheet forming processes			Prediction of tensile deformation behavior of Al-Li alloy 2060-T8 by computational homogenization-based crystal plasticity finite element method	Coupling analysis of molten pool during fused coating process with arc preheating	A plane stress yield function described by multi-segment spline curves and its application
16:00	16:20	MS1-21			MS5-9	MS7-9	MS9-9
		An elasto-plastic constitutive model of magnesium alloy sheet at warm forming temperature under strain path changes			A multiscale model to incorporate texture evolution into phenomenological plasticity models	An adaptive-domain-growth method for phase field simulation of dendrite growth in arc preheated fused-coating additive manufacturing	Evaluation of accuracies of phenomenological yield criteria for automotive Al sheets
16:20	16:50	Coffee Break					

MON, July 30

Session Title		Kwansoo Chung Memorial Symposium III: Mechanics in Materials Forming	Composites	Advanced Simulation and Material Characterization for Micro Metal Forming	Numerical Methods	Analysis of Sheet Metal Joining and Welding Phenomena III	Material Modelling for Sheet Metal Forming Simulations III
Chair		W. Lee	T. Oya	M. Yang	O. Cazacu	Z. Li	T. Balan
16:50	17:20	MS1-9: Keynote	GS1-1: Keynote	MS11-1: Keynote	GS6-1: Keynote	MS7-10: Keynote	MS9-10: Keynote
		Prediction of fracture behavior in hole expansion test using microstructure based dual-scale model	Deformation behavior analysis based on matrix/yarn sliding friction model of woven fabric green composite under simple tension	Development of in-situ observation methods of surface roughening behavior by hand-size stretching test for metal foils	Microstructure-based multiscale approach to obtain mechanical property of duplex stainless steel according to ICME concept	Interaction of laser beam, powder stream and molten pool in laser deposition processing with coaxial nozzle	Development of the user subroutine library "Unified Material Model Driver for Plasticity (UMMDp)" for various anisotropic yield Functions
17:20	17:40	MS1-10	GS1-2	MS11-2	GS6-2	MS7-11	MS9-11
		A Multi-Scale Modelling of 3rd Generation Advanced High Strength Steels to Account for Anisotropic Evolution of Yield Surface and Plastic Potential	Influence of temperature on in-plane and out-of-plane mechanical behaviour of GFRP composite	Crystal plasticity finite-element analysis of surface roughening behaviour in biaxial stretching of steel sheets	Efficient Isogeometric shell element with through-thickness stretch: application to incremental sheet forming	The effect of sheet metal anisotropy on the calibration of an equivalent model for clinched connections	Development of plug-ins for bridging the variables between advanced finite element codes and 'UMMDp'
17:40	18:00	MS1-11	GS1-3	MS11-3	GS6-3	MS7-12	MS9-12
		Formability predictions and measurement of 316L stainless steel using self-consistent crystal plasticity	Numerical modeling of thermoplastic resin behavior for thermoforming of laminates composed of non-crimp fabrics	Deformation-induced surface roughening of an Al-Mg alloy	Automatic calibration of 3D anisotropic yield criteria using a parallel evolutionary algorithm	Welding distortion prediction and process optimization of turbine component by electron beam welding	Implementation of anisotropic yield functions into the subroutine library "UMMDp"
18:00	18:20	MS1-12		MS11-4	GS6-4	MS7-13	MS9-13
		FE implementation of HAH model using FDM-based stress update algorithm for springback prediction of AHSS sheets		Design of a reverse deep drawing experiment enhancing strain path changes	A GPU based explicit solid-shell finite element solver	Numerical simulation and experimental validation of self-piercing riveting (SPR) of 6XXX aluminum alloys for automotive applications	Practical examples of sheet metal forming simulations using the subroutine library 'UMMDp'
18:20	18:40	MS1-22			GS6-5		
		Crystal plasticity based constitutive modeling of ZEK100 magnesium alloy combined with in-situ HEXRD experiments			Investigation of blank bow defect after roller leveller by finite element analysis		
19:00	21:00	**Welcome Banquet (EAST 21 Hall)**					

Tue, July 31

ROOM		Room 1
8:30	9:20	Industrial plenary lecture: **Hiroshi Fukiharu**, *JSOL CORPORATION* **The Current Status and Development of Practical Sheet Metal Forming Simulation**
9:20	10:10	Academic plenary lecture: **Viggo Tvergaard**, *Technical University of Denmark (DTU)* **Plastic Flow Localization and Ductile Fracture**
10:10	10:40	Coffee Break

ROOM		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6
Session Title		Kwansoo Chung Memorial Symposium IV: Mechanics in Materials Forming	Springback, Elasticity and Time Effects in Forming I	Fracture and Damage I	Process Design and Optimization I	Analysis of Sheet Metal Joining and Welding Phenomena IV	Material Modelling for Sheet Metal Forming Simulations IV
Chair		J.-W. Yoon	A.H. van den Boogaard	S. Takahashi	P. Hora	Liqun Li	H. Takizawa
10:40	11:10	MS1-13: Keynote	MS10-1: Keynote	GS2-1: Keynote	GS5-1: Keynote	MS7-14: Keynote	MS9-14: Keynote
		A crystal plasticity study on the deformation of an AZ31 alloy sheet under elevated temperature	Spring-back prediction based on a rate-dependent isotropic-kinematic hardening model and its experimental verification	Extension of the DF2015 criterion into an anisotropic ductile fracture criterion	Drawbead uplift force analytical model for deep drawing operations	Investigating the influence of external restraint on welding distortion in thin-plate welded structures by means of numerical simulation technology	The application of crystal plasticity material files in stamping simulations
11:10	11:30	MS1-14	MS10-2	GS2-2	GS5-2	MS7-15	MS9-15
		Failure prediction of AZ31B Mg sheet at room temperature considering material anisotropy and differential work hardening	The effect of loading modes on springback behaviour of austenitic stainless steels sheets in three points bending	Identification method of an advanced constitutive law for nickel-based alloy Haynes 230 used in solar receivers	Study of V-bending deformation characteristics of magnesium alloy sheet in warm forming	Numerical analysis on stress evolution during GTA-additive manufacturing of thin-walled aluminum alloys	Prediction of mechanical response and microstructure evolution for 5000-Serie Aluminum Alloy coupling visco-plastic self-consistent approach with finite element method
11:30	11:50	MS1-15	MS10-3	GS2-3	GS5-3	MS7-16	MS9-16
		Effect of distortional hardening behaviour on material response of pure titanium sheets during hydraulic bulge test	Investigation on strain dependent elastic behavior for accurate springback analysis	A new strain-based method to determine GTN parameters for thin stainless steel foil	A software package for toolpath generation and process simulation of incremental sheet forming	Modeling of process parameters and sectional shape of sample in single-layer aingle-pass Sn63Pb37 fused coating additive manufacturing	Experimental and numerical investigation of ironing in deep drawn parts
11:50	12:10	MS1-16	MS10-4	GS2-4	GS5-4	MS7-17	MS9-17
		Constitutive modeling and FE implementation for anisotropic hardening under proportional loading conditions	Kinematic hardening performance of 5052 aluminum alloy subjected to cyclic compression-tension	On the effect of stress state on the failure limits of hole-flanged parts formed by SPIF	Intermediate shapes for incremental sheet forming	Research on remelting phenomena and metal joining of fused-coating additive manufacturing	The evolution of mechanical properties of AISI 301 as a result of phase reversion heat treatment, experiment and modeling
12:10	13:30	**Lunch**					

Tue, July 31

ROOM		Room 1					
13:30	14:10	Industrial plenary lecture: **Shunji Hiwatashi**, *Nippon Steel & Sumitomo Metal Corporation* **Simulation-Aided Application of Advanced Sheet Steels to Automotive Parts**					
14:10	14:30	Short Coffee Break					
Session Title		**Kwansoo Chung Memorial Symposium V: Mechanics in Materials Forming**	**Springback, Elasticity and Time Effects in Forming II**	**Fracture and Damage II**	**Process Design and Optimization II**	**Sheet Metal Formability: in honor of Prof. Marciniak's 100-year anniversary I**	**Material Modelling for Sheet Metal Forming Simulations V**
Chair		**D. Kim**	**Y. P. Korkolis**	**T. Matsuno**	**J. Mendiguren**	**G. Vincze**	**R. Cardoso**
14:30	15:00	MS1-17: Keynote	MS10-5: Keynote	GS2-5: Keynote	GS5-5: Keynote	MS6-1: Keynote	MS9-18: Keynote
		Ductile fracture of AA6111 alloy including the effect of bake-hardening	A constitutive law based on the self-consistent homogenization theory for improved springback simulation of a dual-phase steel	Failure prediction in incremental sheet forming based on Lemaitre damage model	Numerical investigation of a new sheet metal shear cutting tool design to increase the part quality by superposed compression stress	Experimental and numerical investigations on determination of strain localiza tion in sheet forming	Work-hardening behaviour of sheet steels in large strain regions and its simple approximation
15:00	15:20	MS1-18	MS10-6	GS2-6	GS5-6	MS6-2	MS9-19
		Influence of paint baking process on fracture initiation of an Al-Mg-Si alloy sheet	Effect of pre-strain on creep behavior of titanium alloy sheets and springback simulation	Damage mechanics modelling of material separation in self-pierce riveting (SPR) process	Energy efficient roll forming processes through numerical simulations	The performance of Marciniak–Kuczinsky approach on prediction of plastic instability of metals subjected to complex loadings	Biaxial deformation and martensitic transformation behavior observation on type 304 stainless sheet by biaxial bulge test
15:20	15:40	MS1-19	MS10-7	GS2-7	GS5-7	MS6-3	MS9-20
		Constitutive modelling of carbon fiber-reinforced shape memory polymer composites	Crystal-plasticity finite-element simulation of time-dependent springback in a commercially-pure titanium sheet	Measurement of local necking in tensile test of mild steel sheet for forming numerical simulation	Numerical study on the thickness homogenization in hole-flanging by SPIF	Phenomenological model for prediction of localized necking in multi-step sheet metal forming processes multi-step sheet metal forming processes	Finite element analysis of AHS steel under dynamic loading using a micromechanical modelling
15:40	16:00	MS1-20	MS10-8	GS2-8	GS5-8	MS6-4	MS9-21
		Effect of deformation induced nonlinear and anisotropic elasto-plasticity on sheet forming simulations	Investigation on stress relaxation behavior of high-strength steel sheets based on elasto-viscoplasticity	Numerical investigations on a framework for fracture prediction in metal forming with a material model based on stress-rate dependence and non-associated flow rule	Analyses of press formability of CFRP sheet considering the fiber kinking and the ductile behavior of resin	Evolution of plastic anisotropy and strain rate sensitivity	Parameter calibration for a shear modified GTN damage model and its application to forming limited prediction
16:00	16:20					MS6-5	MS9-22
						Multi-stage two point incremental sheet forming	Simulation of electrohydraulic free forming of DP600 sheets using a modified Rousselier damage model
16:20	16:50	Coffee Break					

ROOM			Room 2	Room 3	Room 4	Room 5	Room 6
Session Title			Springback, Elasticity and Time Effects in Forming III	Fracture and Damage III	Process Design and Optimization III	Sheet Metal Formability: in honor of Prof. Marciniak's 100-year anniversary II	Material Modelling for Sheet Metal Forming Simulations VI
Chair			H. Huh	K. Narasimhan	K. Hayakawa	D. Banabic	K. Oide
16:50	17:20		MS10-9: Keynote	GS2-9: Keynote	GS5-9: Keynote	MS6-6: Keynote	MS9-23: Keynote
			Numerical simulation of forming and springback of ultra-thin copper alloy sheets	Material characterization and fracture prediction with advanced constitutive model and polar EPS fracture diagram for AA 3104-H19	Metamodel-based methods to verify the feasibility of a process control in deep drawing	A microstructure based modelling of high strength steel sheet under stretch-bending	Generalization of Hill's yield function for planar plastic anisotropy
17:20	17:40		MS10-10	GS2-10	GS5-10	MS6-7	MS9-24
			Analysis of anisotropic effects in single point incremental forming	Development of the crack-line-update method for two-dimensional piercing simulations	Investigation on stretch forming process of thick double-curved aluminium alloy component	Prediction of the formability limit using damage mechanics	Earing prediction of AA 2008-T4 with anisotropic Drucker yield function based on the second and third stress invariants
17:40	18:00		MS10-11	GS2-11	GS5-11	MS6-8	MS9-25
			Accurate prediction of springback after coining operation	Finite element analysis of blanking operation of magnesium alloy (AZ31) sheet using ductile fracture criteria and its experimental verification at various temperatures	Stamping parameters optimization of a AA5754 A-pillar by response surface methodology	Influence of alloy chemistry on the texture evolution and plastic anisotropy of ultra-fine grained aluminum alloys	Influence of hardening functions on earing prediction in cup drawing of AA3104 aluminum alloy sheet
18:00	18:20					MS6-9	MS9-26
						Toward development of optimum specimen designs and modeling of in-plane uniaxial compression testing of aluminum alloy 2024 and AISI 1008 steel sheet material	An alternative procedure to identify stress-strain relation for DP980 sheet over a large strain range

Wed, Aug 1

ROOM		Room 1
8:30	9:20	Academic plenary lecture: **Peidong Wu**, *McMaster University* **Crystal Plasticity Modelling of Large Strain Behaviour of HCP Materials**
9:20	10:10	Academic plenary lecture: **Yasumasa Chino**, *National Institute of Advanced Industrial Science and Technology* **Enhanced Room Temperature Formability of Magnesium Alloy Sheets by Suppression of Basal Texture Formation**
10:10	10:40	Coffee Break

ROOM			Room 2	Room 3	Room 4	Room 5	
Session Title			Springback, Elasticity and Time Effects in Forming IV	Material Testing I	Numerical Simulation of Locally Acting Sheet Manufacturing Processes	Advanced Technology for Sheet Metal Forming	
Chair			S. Thuillier	M. Kuroda	A. M. Habraken	K. Manabe	
10:40	11:10		MS10-12: Keynote	GS3-1: Keynote	MS8-1: Keynote	GS0-1: Keynote	
			Effect of warm forming on formability and springback of aluminum alloy brazing sheet	Prediction of flow stress curve of metallic foam using compressible constitutive equation	Experimental and numerical analysis of the flanging process by SPIF	Recent developments in multi-disciplinary applications of stamping simulation	
11:10	11:30		MS10-13	GS3-2	MS8-2	GS0-2	
			Guideline to optimize the convergence behaviour of the geometrical springback compensation	Cruciform specimen design for large plastic strain during biaxial tensile testing	Experiments and simulation of shape and thickness evolution in multi-pass tube spinning	Validation of the stoning method by numerical and experimental investigation of outer panels with and without surface deflections	
11:30	11:50		MS10-14	GS3-3	MS8-3	GS0-3	
			Evaluation of all springback aspects through a success story on Ford Cargo Truck Door Opening Part	Improvement of the drawing ratio of the anisotropic material behaviour under near plane strain conditions for DP600 characterized in elliptic hydraulic bulge test	Study on spinning process of thin-walled curvilinear generatrix parts based on variable thickness blanks	Cellular automaton calculation for dynamic recrystallization	
11:50	12:10			GS3-4	MS8-4		
				Examination of evaluation method of uniaxial compressive property of cold-formed duplex embossed sheet metal by FEM analysis	Method to increase denting stiffness of car body skin panels		
12:10	13:20		**Lunch**				

ROOM		Room 1
13:30	14:10	Industrial plenary lecture: **Eiji Iizuka**, *JFE Steel Corporation* **Forming Analysis Technologies for Application of High Strength Steels to Automotive Parts**
14:10	14:30	Short Coffee Break
14:30	14:40	**Benchmark: Introduction**
14:40	15:30	**Benchmark 1** **Hole Expansion of High Strength Steel Sheet**
15:30	16:20	**Benchmark 2** **Cup Drawing of Anisotropic Thick Steel Sheet**
16:20	17:10	**Benchmark 3** **Prediction of Yield Locus and R-value Distribution for 5000-Series Aluminum Alloy Sheet Using Crystal Plasticity Analysis**

Thu, Aug 2

ROOM			Room 2	Room 3	Room 4	Room 5	
Session Title			Materials and Process Modeling for Hot-Stamping I	Material Testing II	Friction and Wear in Sheet Metal Forming I	Innovative Forming Methods I	
Chair			X. Li	T. Iizuka	T. Chezan	S.-h. Zhang	
8:40	9:10		MS2-1: Keynote	GS3-5: Keynote	MS12-1: Keynote	GS4-1: Keynote	
			Biaxial deformation on AA5182-O aluminum alloy sheet at warm temperature	Ductile failure under combined tension and shear	Friction in sheet metal forming: forming simulations of dies in try-out	Double sided incremental forming: capabilities and challenges	
9:10	9:30		MS2-2	GS3-6	MS12-2	GS4-2	
			Development of a material model for AA7075 aluminium hot stamping	Influence of zinc coating on anisotropic mechanical properties of hot dip galvanized steel sheet DP600	Data-driven modelling in the era of Industry 4.0: A case study of friction modelling in sheet metal forming simulations	Electromagnetically assisted sheet metal stamping with non-disposable foil coils	
9:30	9:50		MS2-3	GS3-7	MS12-3	GS4-3	
			Unified constitutive model of aluminum alloy 2219 at elevated temperature	Characterization of mechanical properties and formability of a superplastic Al-Mg alloy	Temperature dependent micromechanics-based friction model for cold stamping processes	Numerical and experimental investigation on tube hot gas forming process for UHSS	
9:50	10:10			GS3-8	MS12-4	GS4-4	
				Characterization of high strain rate material behaviour for high-speed forming and cutting applications	Temperature analysis during the drawing of an aluminum cylindrical cup	Characterization of ultra-fine grained AA 6061 alloy sheets processed through two different severe plastic deformation techniques	
10:10	10:40	Coffee Break					

ROOM			Room 2	Room 3	Room 4	Room 5	
Session Title			Materials and Process Modeling for Hot-Stamping II	Material Testing III	Friction and Wear in Sheet Metal Forming II	Innovative Forming Methods II	
Chair			H. Hamasaki	H. Utsunomiya	J. Hol	V. Reddy	
10:40	11:10		MS2-4: Keynote	GS3-9: Keynote	MS12-5: Keynote	GS4-5: Keynote	
			Suitability of material models in finite element simulation of stress relaxation for titanium sheets	Evaluation of tension-compression asymmetry of a low- carbon steel sheet using a modified classical compression test method	Strategies for increasing the accuracy of sheet metal forming finite element models	Experimental investigation of novel impact hydroforming technology on sheet metal formability	
11:10	11:30		MS2-5	GS3-10	MS12-6	GS4-6	
			Properties prediction modelling for hot stamping products and its validation in a U-cap part	Sheet thickness reduction influence on fracture strain determination	Study of frictional contact conditions in the hole expansion test	Case studies on chain-die forming for AHSS	
11:30	11:50		MS2-6	GS3-11	MS12-7	GS4-7	
			Analysis of flow stress behaviour of inconel alloys at elevated temperatures using constitutive model	Material testing in support of the development and calibration of material models for forming simulations	Evaluation of surface asperity based contact friction models under different conditions	Comparison of thickness variation in multistage deep drawing of a stator motor housing by experimental and simulation methods	
11:50	12:10		MS2-7		MS12-8	GS4-8	
			Deep drawing of press hardening steels		Modeling of contact zones in air bending of sheet metals	Developing a progressive draw with ironing tool for manufacturing a solenoid casing	
12:10	13:20	**Lunch**					
13:30	17:00	**Excursion** T-1 TOKYO SKYTREE® (40) T-2 ①River Cruise & Hama-rikyu Gardens (80) (English guide) T-2 ②River Cruise & Hama-rikyu Gardens (40) (Japanese guide) T-3 Meiji Shrine & Harajuku (80) T-4 Edo-Tokyo Museum and Asakusa(40)					
18:00	20:30	**Farewell Banquet (EAST 21 Hall)**					

Fri, Aug 3		
ROOM		TBD
10:00	10:15	**Closing Remark**
10:30	18:30	**Technical Tour** 1. JAXA (Chofu Aero Space Center) 2. Nissan Yokohama Plant 3. JFE Chiba Steel Plant 4. Amada Press Machine Exhibition Center