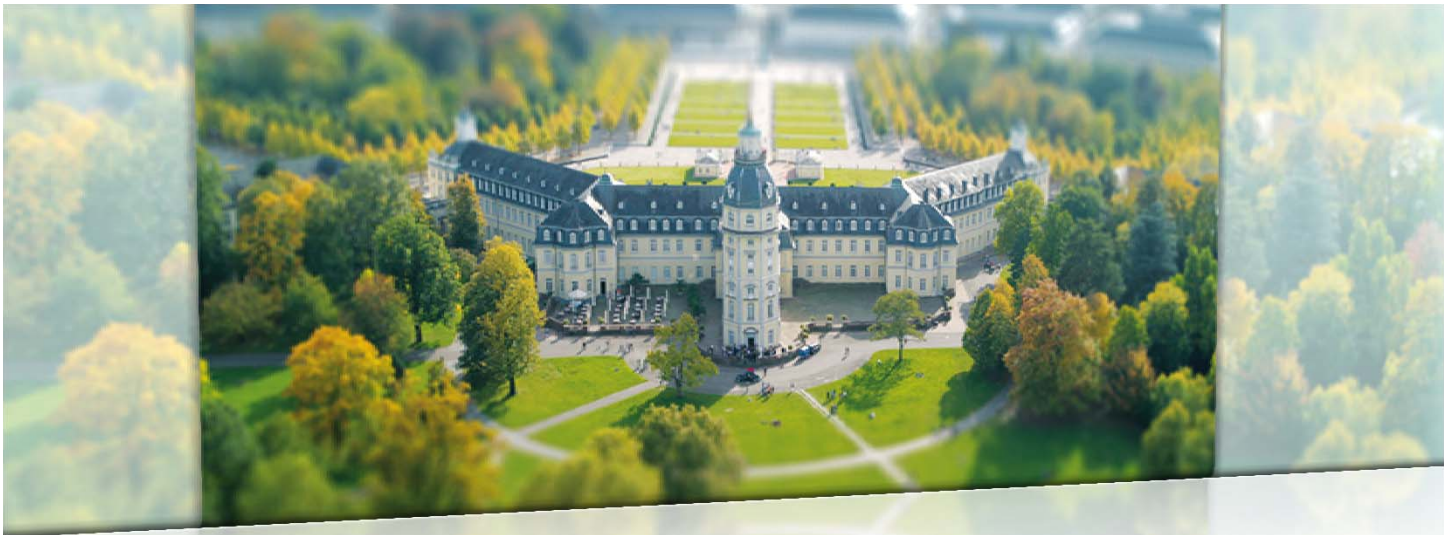




15th CIRP Conference on Modelling of Machining Operations

Karlsruhe, Germany

June 11 - 12, 2015

Preliminary Program of the Conference



- **Travelling to Karlsruhe by road, or rail:**

Karlsruhe is located on a major road and rail intersection and can be reached quickly and easily from all directions via the A 5, A 8, or A 65 motorways to all parts of the city.

Trams or buses provide your connection to the city centre (from main train station to “Konzerthaus” take bus 10).

- **Travelling to Karlsruhe by air:**

Karlsruhe/Baden-Baden (approx. 30 minutes by car), the international airports of Stuttgart and Strasbourg (50–60 minutes by car). Or arrive at Frankfurt/Main international airport and take a high-speed train from the adjoining ICE station to Karlsruhe in exactly one hour.

- **Further Information**

Conference venue

www.messe-karlsruhe.de

Public transport

www.kvv.de

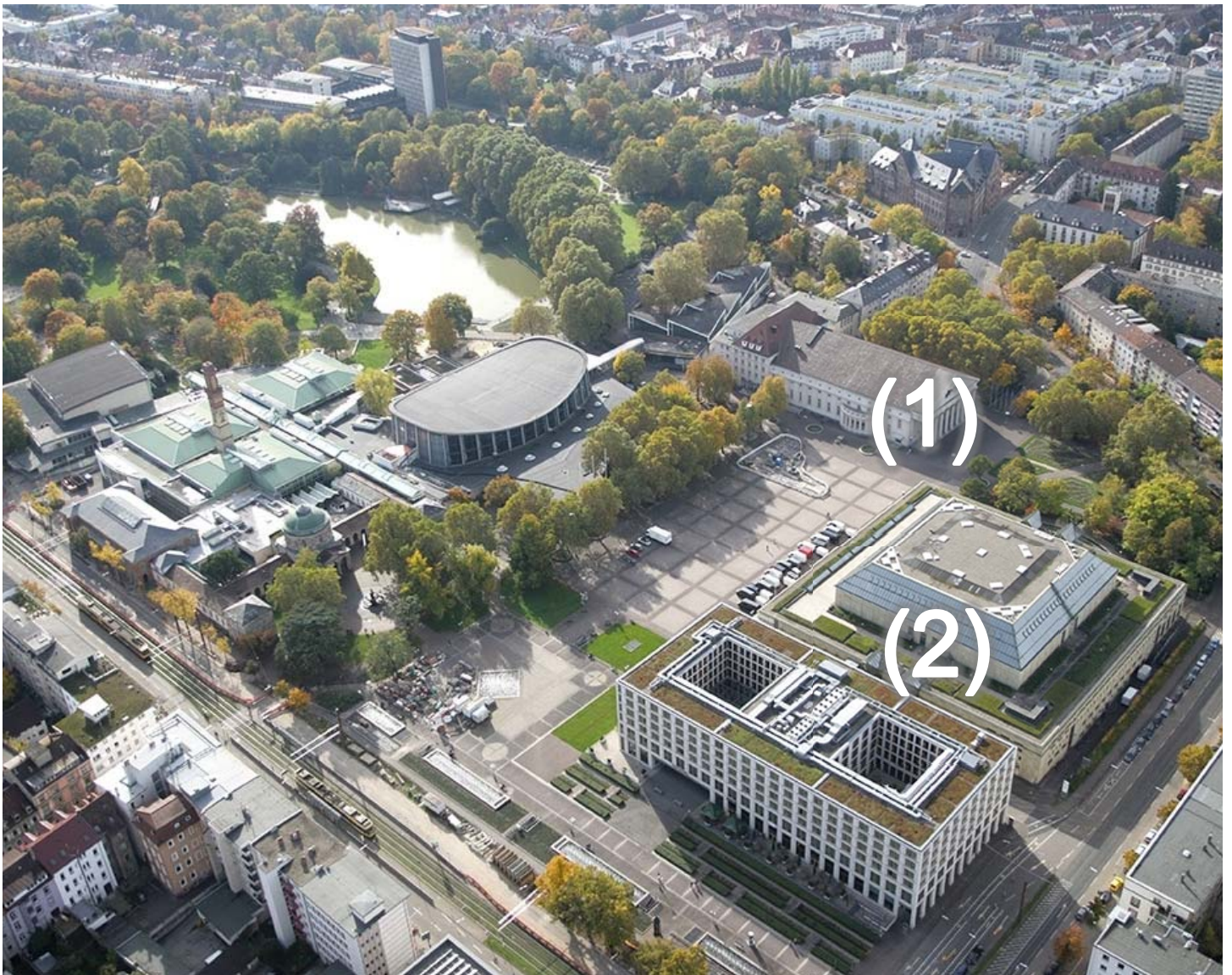
Organisation of conference

www.cirp-cmmo2015.com

Contact:

info@cirp-cmmo2015.com

- Early registration and get together inside the „Konzerthaus“ (1) on June 10 starting 16:00
- Conference presentations in sub-level of (2) on June 11 - 12
- **Address:**
Kongresszentrum Karlsruhe
Karlsruher Messe- und Kongress-GmbH
Festplatz 9
76137 Karlsruhe
Germany



Keynote speakers

“t.b.d.”

Dr.-Ing. Wilfrid Polley

Daimler AG, Germany



“Integrative Computational Material Engineering (ICME) –
Material's history effects Machining”

Dr.-Ing. Ulrich Prahl

Head of Material Simulation Group in Steel Institute at RWTH Aachen
University, Germany

“Challenges and Opportunities of an NC-Machining
Simulation in the Aircraft Industry”

Dr.-Ing., Dipl.-Inform. Tobias Surmann

Premium AEROTEC GmbH Germany



“Meanfield and micromechanics based modeling of metals”

Prof. Dr.-Ing. habil. Thomas Böhlke

Professor at the Institute of Engineering Mechanics, Chair for Continuum
Mechanics, Karlsruhe Institute of Technology (KIT), Germany

„Advantages of virtual production“

Dipl.-Ing. (FH) Dipl.-Wirt.-Ing. (FH) Eberhard Beck

INDEX-Werke GmbH & Co. KG, Germany



“Atomistic simulation of machining: the origin of folding
instabilities on polycrystalline metal surfaces”

Prof. Dr. Michael Moseler

Professor „Modelling and Simulation of Functional Nanosystems“ at Albert-
Ludwigs-University, Freiburg, Germany

15th CIRP Conference on Modelling of Machining Operations

Location: Karlsruhe Convention Centre
Festplatz 9 - 76137 Karlsruhe

PROGRAM OVERVIEW

Early Registration	June 10th
Get together	
Opening session / Keynote Speeches	
Parallel sessions	
Surface integrity Dynamics and stability of machining Optimization of machining processes Modelling of material behaviour Thermal effects in machining processes High Performance machining Non-conventional machining Micro Machining Processes	June 11th
Conference dinner	
Opening session / Keynote Speeches	
Parallel sessions	June 12th
Wear and Built up Edges Thermal effects in machining processes Grinding Modelling of material behaviour Monitoring and Diagnostics Dynamics and stability of machining	

PROGRAM FOR ORAL PRESENTATIONS

Wednesday, June 10th afternoon

16:00 - 18:00	Early Registration & Get together Konzerthaus (Festplatz 9 - 76137 Karlsruhe)
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Thursday, June 11th morning

8:00 - 9:00	Registration			
9:00 - 9:30	Opening Session			
	Keynote Session 1			
9:30 - 10:10	Title pending			
	Dr.-Ing. Wilfrid Polley, Daimler AG, Stuttgart, Germany			
10:10 - 10:50	Integrative Computational Material Engineering (ICME) – Material's history effects Machining			
	Dr.-Ing. Ulrich Prahl, RWTH Aachen University, Aachen, Germany			
10:50 - 11:10	Coffee break			
	Surface integrity	Dynamics and stability of machining	Optimization of machining processes	Modelling of material behaviour
11:10 - 11:30	Surface Layer Modification by Cryogenic Burnishing of Al 7050-T7451 Alloy and Validation with FEM-Based Burnishing Model B. Huang, Y. Kaynak, Y. Sun, I.S. Jawahir	Variable compliance-related aspects of chatter in turning thin-walled tubular parts A. Gerasimenko, M. Guskov, J. Duchemin, P. Lorong, A. Gouskov	Analysis of Feature Extracting Ability for Cutting State Monitoring Using Deep Belief Networks Y. Fu, Y. Zhang, H. Qiao, D. Li, H. Zhou, J. Leopold	Novel approach for 3D Simulation of a Cutting Process with Adaptive Remeshing Technique F. Zanger, N. Boev, V. Schulze
11:30 - 11:50	Influence of the cutting tool compliance on the workpiece surface shape in face milling of workpiece compounds B. Denkena, E. Hasselberg	Integrated simulation system for 5-axis milling cycles T. L.Taner, S. Matej, K. Jan	Experimental Validation of a Physics-based Simulation Approach for Pneumatic Components for Production Systems in the Automotive Industry F. Damrath, A. Strahilov, Th. Bär, M. Vielhaber	Machining Process Simulations with Smoothed Particle Hydrodynamics F. Spreng, P. Eberhard
11:50 - 12:10	Mold manufacturing optimization: a global approach of milling and polishing processes L. Grandguillaume, S. Lavernhe, Y. Quinsat, C. Tournier	High performance machining enabled by adaptive machine components J. Bartscher, S.-F. Koch, J. Bauer, H. Wagner, J. Fleischer	Finite Element Simulation for Quality Dependent Lifetime Analysis of Micro Gears B. Haefner, M. Quiring, J. Gullasch, G. Glaser, T. Dmytruk, G. Lanza	An elastoplastic constitutive damage model to simulate the chip formation process and workpiece subsurface defects when machining CFRP composites S. Zenia, L. Ben Ayed, M. Nouari, A. Delamézière
12:10 - 12:30	Prediction of Residual Stresses after Laser-assisted Machining of Inconel 718 Using SPH M. A. Balbaa, Mohamed N.A. Nasr	Hardware-in-the-Loop Machine Simulation for Modular Machine Tools M. Witt, P. Klimant	Ontology-based determination of alternative CNC machines for a flexible resource allocation G. Rehage, J. Gausemeier	Influence of kinematic hardening during machining of ARMCO iron F. Zanger, A. Fellmeth, M. Gerstenmeyer, V. Schulze
12:30 - 12:50	Springback in metal cutting with high cutting speeds N. Schaal, F. Kuster, K. Wegener	The concept of active elimination of vibrations in milling process A. Weremczuk, R. Rusinek, J. Warminski	Universal Concept for the Optimization of Step Sizes in Manufacturing Processes M. Senn, F. Schweizer, W. Pfeiffer	On the selection of Johnson-Cook constitutive model parameters for Ti-6Al-4V using three types of numerical models of orthogonal cutting Y. Zhang, J.C. Outeiro, T. Mabrouki
12:50 - 13:50	Lunch break			
	Keynote Session 2			
13:50 - 14:30	Challenges and Opportunities of an NC-Machining Simulation in the Aircraft Industry Dr.-Ing., Dipl.-Inform. Tobias Surmann, Premium AEROTEC GmbH, Varel, Germany			
14:30 - 15:10	Meanfield and micromechanics based modeling of metals Prof. Dr.-Ing. habil. Thomas Böhlke, KIT, Karlsruhe, Germany			
15:10 - 15:30	Coffee break			

Thursday, June 11th afternoon

	Surface integrity	Thermal effects in machining processes	High Performance machining	Non-conventional machining
15:30 - 15:50	Effects of Sequential Cuts on Residual Stresses when Orthogonal Cutting Steel AISI 1045 M.N.A. Nasr	Considering the Influence of Minimum Quantity Lubrication for Modelling Changes in Temperature, Forces and Phase Transformations during Machining P. Bollig, C. Faltin, R. Schießl, J. Schneider, U. Maas, V. Schulze	Effect of rake angle on strain field during orthogonal cutting of hardened steel with c-BN tools Th. Baizeau, S. Campocasso, G. Fromentin, F. Rossi, G. Poulachon	Energy-based approaches for multi-scale modelling of material loadings during Electric Discharge Machining (EDM) F. Klocke, S. Schneider, S. Harst, D. Welling, A. Klink
15:50 - 16:10	An analytical model of residual stress for flank milling of Ti-6Al-4V X. Huang, X. Zhang, H. Ding	Simulation of MQL Deep Hole Drilling for Predicting Thermally Induced Workpiece Deformations D. Biermann, H. Blum, J. Frohne, I. Iovkov, A. Rademacher, K. Rosin	Influences of micro mechanical property and microstructure on performance of machining high chromium white cast iron with cBN tools Ling Chen, Jinming Zhou, Volodymyr Bushlya, Jan-Eric Stahl	Multiphysics Simulation of the Material Removal in Jet Electrochemical Machining M. Hackert-Oschätzchen, R. Paul, M. Kowalick, A. Martin, G. Meichsner, A. Schubert
16:10 - 16:30	Numerical simulation of surface modification during machining of nickel-based superalloy S. Caruso, St. Imbrogno, G. Rotella, M. I. Ciaran, P.-J. Arrazola, L. Filice, D. Umbrello	Tool temperatures and wear in micro-machining Cu-Ni alloys with diamond tools: models, simulations and experiments T.H.C. Childs, C.J. Evans, E.C. Browy, J.R. Troutman, E. Paul	A solid modeler based engagement model for 5-axis ball end milling I. E. Yigit, S. Ehsan Layegh K., I. Lazoglu	A contribution on the modelling of wire electrical discharge machining of a γ-TiAl alloy G. Gautier, P.C. Priarone, S. Rizzuti, L. Settineri, V. Tebaldo
16:30 - 16:50	Surface roughness modelling in face milling C. Felhö, B. Karpuschewski, J. Kundrák	Cryogenic milling of Aluminium-lithium alloys: thermo-mechanical modelling towards fine-tuning of part surface residual stress X. Zhang, H. Mu, X. Huang, Z. Fu, D. Zhu, H. Ding	Analysis and modelling of the contact radius effect on the cutting forces in cylindrical and face turning of Ti6Al4V titanium alloy T. Dorlin, G. Fromentin, J.-P. Costes	CFD simulation of the Abrasive Flow Machining process E. Uhlmann, C. Schmiedel, J. Wendler
16:50 - 17:10	Coffee break			
	Surface integrity	Thermal effects in machining processes	High Performance Machining	Micro Machining Processes
17:10 - 17:30	Evaluating Residual Stresses Induced by Drilling of Ti-6Al-4V Alloy by Using an Experimental-Numerical Methodology J. Nobre, J. C. Outeiro	Experimental Study and Modeling of Steady State Temperature Distributions in Coated Cemented Carbide Tools in Turning A. Thakare, A. Nordgren	Cutting simulation of titanium alloy drilling with energy analysis and FEM T. Matsumura, S. Tamura	Predictive modelling of cutting force and its influence on surface accuracy in ultra-high precision machining of contact lenses O.A. Olufayo, K. Abou-El-Hossein
17:30 - 17:50	Prediction of the 3D Surface Topography after Ball End Milling and its Influence on Aerodynamics B. Denkena, V. Böß, D. Nesper, P. Gilge, S. Hohenstein, J. Seume	An analytical model of the temperature distribution in the chip breakage location of metal cutting operations F. Klocke, D. Lung, D. Veselovac, S. Buchkremer	Analytical Modelling of Milling Forces for Helical End Milling Based on a Predictive Machining Theory Z. Fu, W. Yang, X. Wang, J. Leopold	Least-squares based parameter identification for a function-related surface optimisation in micro ball-end milling J. Vehmeyer, I. Piotrowska-Kurczewski, F. Böhmermann, O. Riemer, P. Maaß
17:50 - 18:10	Experimental Study and Modeling of Machining with Dry Compressed Air, Flood and Minimum Quantity Cutting Fluid Cooling Techniques M. Ravi Sankar, S.K. Choudhury	The mechanics of cutting: In-situ measurement and modelling M. Abouridouane, F. Klocke, D. Lung, D. Veselovac	Sensitivity Analysis of Cryogenic Cooling on Machining of Magnesium Alloy AZ31B-O M. N.A. Nasr, J.C. Outeiro	Modelling of grain motion for three-body abrasion I. Loesch, O. Riemer
19:00 - 19:30	Bus transfer from Kongresszentrum to Ettlingen, Schlossgartenhalle			
20:00 - 23:00	Conference dinner			

Friday, June 12th morning

	Keynote Session 3			
8:00 - 8:45	Advantages of virtual production			
	Dipl.-Ing. (FH) Dipl.-Wirt.-Ing. (FH) Eberhard Beck, INDEX-Werke GmbH & Co. KG, Esslingen, Germany			
8:45 - 9:30	Atomistic simulation of machining: the origin of folding instabilities on polycrystalline metal surfaces			
	Prof. Dr. Michael Moseler			
9:30 - 9:50	Coffee break			
	Wear and Built up Edges	Thermal effects in machining processes	Grinding	Modelling of material behaviour
9:50 - 10:10	Finite element prediction of the tool wear influence in Ti6Al4V machining F. Ducobu, P.-J. Arrazola, E. Riviere-Lorphève, E. Filippi	Determination of the Thermal Load Distribution in Internal Traverse Grinding using a Geometric-Kinematic Simulation S. Schumann, T. Siebrecht, P. Kersting, D. Biermann, R. Holtermann, A. Menzel	A Meta-model framework for Grinding Simulation M. Leonesio, M. Sarhangi, G. Bianchi, P. Parenti, A. Cassinari	Modelling of vibration assisted machining f.c.c single crystal S.A. Zahedi, A. Roy, V.V. Silberschmidt
10:10 - 10:30	Characterization and modelling of the rough turning process of large-scale parts: tribological behaviour and tool wear analyses B. Haddag, H. Makich, M. Nouari, J. Dhers	Parameter identification for finite element based models in dry machining applications H. Wernsing, C. Büskens	The development of dislodgement free diamond electroplated wheel for engineering ceramic grinding processes G. Zhi, X. Li, S. Wolf, Y. Rong	A new method to determine material parameters from machining simulations using inverse identification M. Bäker
10:30 - 10:50	A new procedure to increase the orthogonal cutting machining time simulated M. Guediche, T. Mabrouki, C. Donnet, J.M. Bergheau, H. Hamdi	Heat Flux in Cutting: Importance, Simulation and Validation M. Putz, G. Schmidt, U. Semmler, M. Dix, M. Bräunig, M. Brockmann, S. Gierlings	Discrete Element Modelling of Drag Finishing E. Uhlmann, A. Eulitz, A. Dethlefs	Inverse Determination of Constitutive Equations and Cutting Force Modelling for Complex Tools Using Oxley's Predictive Machining Theory B. Denkena, T. Grove, M. Dittrich, D. Niederwestberg, M. Lahres
10:50 - 11:10	A Combined Empirical and Numerical Approach for Tool Wear Prediction in Machining K. Hosseinkhani, E. Ng	Prediction of temperature induced shape deviations in dry milling B. Denkena, A. Schmidt, P. Maaß, D. Niederwestberg, C. Niebuhr, J. Vehmeyer	Predictive modeling of surface roughness in grinding S. K. Khare, S. Agarwal	Characterization of the cutting forces generated during the gear hobbing process: Spur gear N. Sabkhi, C. Pelaingre, C. Barlier, A. Moufki, M. Nouari
11:10 - 11:30	Influence of the built-up edge on the stress state in the chip formation zone during orthogonal cutting of AISI1045 E. Uhlmann, S. Henze, K. Brömmelhoff	Development and validation of a hybrid model for the prediction of shape deviations in dry machining processes M. Gulpak, J. Sölter	Analysis of Measured and Predicted Residual Stresses Induced by Finish Cylindrical Grinding of High Speed Steel with CBN Wheel H. Sallem, H. Hamdi	On the Analytical Representation of Chip Area and Tool Geometry when Oblique Turning with Round Tools. Part 1: Chip Area Parameters under Variation of Side and Back Rake Angle V. Bushlya, F. Schultheiss, O. Gutnichenko, J.M. Zhou, J.-E. Stahl
11:30 - 11:50	Comparative analysis of PCD drill designs during drilling of CFRP laminates Y. Karpat, O. Bahtiyar	Analytical Modelling Methods for Temperature Fields in Metal Cutting based on Panel Method of Fluid Mechanics F. Klocke, M. Brockmann, S. Gierlings, D. Veselovac, D. Kever, B. Roidl, G. Schmidt, U. Semmler	Analysis of Process Forces for the Precision Honing of Small Bores U. Moos, D. Bähre	On the Analytical Representation of Chip Area and Tool Geometry when Oblique Turning with Round Tools. Part 2: Variation of Tool Geometry along the Edge Line V. Bushlya, F. Schultheiss, O. Gutnichenko, J.M. Zhou, J.-E. Stahl
11:50 - 13:00	Lunch break			

Friday, June 12th afternoon

	Monitoring and Diagnostics	Thermal effects in machining processes	Dynamics and stability of machining	Modelling of material behaviour
13:00 - 13:20	Orthogonal cutting process modelling considering tool-workpiece frictional effect R. Rusinek, M. Wiercigroch, P. Wahi	Experimental and analytical investigation of workpiece thermal load during external cylindrical grinding St. Jermolajev, C. Heinzel, E. Brinksmeier	Computerized Simulation of Interference in Thread Milling of Non-Symmetric Thread Profiles G. Fromentin, B. Döbbeler, D. Lung	Numerical model of machining considering the effect of MnS inclusions in an austenitic stainless steel G.M.P. Chagas, I. F. Machado
13:20 - 13:40	Mechanistic model for prediction of cutting forces in turning of non-axisymmetric parts I. Cascón, J.A. Sarasua	A novel finite element approach to modeling hard turning in due consideration of the viscoplastic asymmetry effect E.Uhlmann, R. Mahnken, I. Ivanov, C. Cheng	A Method for Identification of Machine-tool Dynamics under Machining H. Cai, B. Luo, X. Mao, L. Gui, B. Song, B. Li, F. Peng	A finite element simulation for orthogonal cutting of UD-CFRP incorporating a novel fibre-matrix interface model A. Abena, S. L. Soo, Kh. Essa
13:40 - 14:00	Development of a Discrete Event Model for energy and resource efficient Milling R. Rentsch, C. Heinzel	Enhanced Machinability of Ti-5553 Alloy from Cryogenic Machining: Comparison with MQL and Flood-cooled Machining and Modeling Y. Sun, B. Huang, D.A. Puleo, I.S. Jawahir	Axis position dependent dynamics of multi-axis milling machines C. Brecher, H. Altstädter, M. Daniels	Multi-physics modelling in machining OFHC copper – coupling of microstructure-based flow stress and grain refinement models Z. Atmani, B. Haddag, M. Nouari, M. Zenasni
14:00 - 14:20	Modelling of part distortion due to residual stresses relaxation: An aeronautical case study L. D'Alvise, D. Chantzis, B. Schoinochoritis, K. Salonitis	A novel simulation approach to determine thermally induced geometric deviations in dry gear hobbing I. Kadashevich, M. Beutner, B. Karpuschewski, T. Halle	Analysis of cutting stability in vibration assisted machining using an analytical predictive force model Y. Gao, R. Sun, J. Leopold	Finite element simulation of semi-finishing turning of Electron Beam Melted Ti6Al4V under dry and cryogenic cooling A. Bordin, S. Imbrogno, G. Rotella, S. Bruschi, A. Ghiotti, D. Umbrello
14:20 - 14:40	Predictive Modelling and Optimization of Machining Parameters to Minimize Surface Roughness using Artificial Neural Network Coupled with Genetic Algorithm G. Kant, K.S. Sangwan	Analysis of the thermal impact on gamma titanium aluminide by grinding with internal coolant supply based on experimental investigation and transient thermal simulation A. Fritsche, F. Bleicher	Modeling and cutting path optimization of shallow shell considering its varying dynamics during machining Y. Liu, B. Wu, M. Luo, D. Zhang	Modeling and Simulation of Machining-Induced Surface Integrity Characteristics of NiTi Alloy Y. Kaynak, S. Manchiraju, I.S. Jawahir
14:40 - 15:00	Multipoint recursive sequential three-point method for on-machine roundness measurement H. Ma, C. Zhuang, Zh. Xiong	Modelling and Experimental Investigation of Cutting Temperature when Rough Turning Hardened Tool Steel with PCBN Tools V. Kryzhanivskyy, V. Bushlya, O. Gutnichenko, I.A. Petruscha, J.-E. Ståhl	3D Finite Element Modeling of Holder-Tool Assembly for Stability Prediction in Milling N. Grossi, F. Montevocchi, A. Scippa, G. Campatelli	
15:00 - 15:30	Closing Session			