



HPC¹⁸

8th CIRP Conference on High Performance Cutting

June 25-27, 2018
Budapest, Hungary
Pesti Vigadó

PROGRAMME BOOK

Content

Welcome	3
Organisers	4
General Information	8
Registration	10
Hotel	10
Social Programmes & Tours	11
Cancellation policy	14
Useful Information	14
Floor Plan	16
Programme Overview	18
Detailed Programme	21
Authors' Index	54

Dear Colleagues,

The 8th CIRP Conference on High Performance Cutting (HPC 2018) is being held between 25-27th of June, 2018 in downtown Budapest, Hungary, where scientists, researchers and industrial partners are presenting their latest results and the cutting edge technology in the field of machining.

The breathtaking venue, the Pesti Vigadó at the Danube bank, is a perfect place to continue the tradition of providing an international forum to exchange new ideas in the community of HPC conferences.

According to the traditions of HPC conferences, the scientific programme is structured into numerous sections on major and challenging pre-defined topics. These are chaired by well-recognized researchers.

It is our pleasure to welcome you in Budapest at this conference to share and improve our knowledge in the diverse fields of manufacturing technologies.



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Prof. László Monostori
 Computer and Automation Research
 Institute of the Hungarian Academy of Sciences



General Conference Co-Chair
Prof. Gábor Stépán
 Department of Applied Mechanics
 Budapest University of Technology
 and Economics

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Department of Applied Mechanics
Budapest University of Technology and Economics

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Department of Applied Mechanics
Budapest University of Technology and Economics
bachrathy@mm.bme.hu

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CONFERENCE OFFICE

CONGRESSLINE LTD.
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University of California, USA

Dr. M. Zatarain
IK4 - Ideko, Spain



General Information

CONFERENCE DATE

June 25-27, 2018

CONFERENCE VENUE

Pesti Vigadó
H-1051 Budapest, Vigadó tér 2.

Pesti Vigadó is located in the heart of the city next to the Danube river (Pest side), about 5 minutes walk from Deák Ferenc tér. Please note that the plenary room, session rooms are on the second floor of the building.

ACCESS BY PUBLIC TRANSPORTATION

The Pesti Vigadó can be reached directly by Tram No. 2. It is also about 5 minutes walk from Deák Ferenc tér, which can be reached by metros (underground) line M1, M2, M3, trams 47,49, buses 9,16, 100E, 105 and trolley bus 72. The closest metro station (line M1) is at the Vörösmarty tér (3 minutes walk).

OFFICIAL CONFERENCE LANGUAGE

The official language of the Conference is English. No translation will be provided.

INTERNET ACCESS

Free WIFI is available during the conference opening hours.

REGISTRATION AND INFORMATION DESK OPENING HOURS

June 25, Monday	07.30- 17.30
June 26, Tuesday	08.00-17.30
June 27, Wednesday	08.00-17.30

HOTLINE TO REGISTRATION DESK

+36 70/608 6806

TECHNICAL INFORMATION FOR SPEAKERS

The organisers kindly ask you to bring your presentations with you on a USB memory stick. Your presentation must be uploaded to the computers in the posted room with the help of the assisting technicians responsible for the dedicated room. The presentation uploading deadline is the last coffee break prior to your scheduled presentation. Please note that double slide projection and personal laptops cannot be used.

PROGRAMME CHANGES

Due to unforeseen circumstances the organisers cannot assume liability for any changes in the scientific programme. Organisers will do their best to keep CIRP HPC 2018 participants up to date, possible changes in programme will be immediately communicated.

CONFERENCE PAPERS PUBLICATION

Full Papers will be published in Procedia CIRP.

All the papers of the CIRP HPC 2018 Conference can be found on the USB pendrive.

MEALS

Included in the registration fee, organisers provide coffee breaks and hot lunches for the participants. The meals are served on the second floor of the conference venue. The serving points are marked on the floorplan in this program book, the serving times are detailed in the program overview.

CONFERENCE BAGS

Conference bags are provided for all registered participants. Please do not put personal belongings (money, ID Cards, mobile phones) in the Conference Bags, since hundreds of similar bags will be around the conference venue, and they could be easily confused.

BADGES

Identification badges are provided along with other conference materials upon registration. The organisers kindly ask you to wear them all the time during the conference. Please also note that your conference badge assures your entrance to conference premises and catering. Persons without badges may be refused. The identification badges are also helpful when contacting the secretariat and other participants.

Registration

Registration types	Early bird fees until April 27, 2018	Regular fees after April 27, 2018	Onsite fees
Participant/Author	EUR 650	EUR 750	EUR 800
Student/Student Author	EUR 450	EUR 550	EUR 600
Accompanying Person	EUR 250	EUR 250	EUR 300

All prices include 27% VAT.

Participant / Author / Student fees include

- Access to all conference sessions
- Conference bag
- Programme booklet
- Attendance at the Ice Breaker
- Attendance at the Farewell Dinner
- Coffee and tea during coffee breaks
- Lunches

The accompanying person fee includes

- Attendance at the Ice Breaker
- Attendance at the Farewell Dinner
- Attendance at a Sightseeing Tour
- Tour bag

Official conference hotels	Single room	Double room
Mercure Budapest City Center H-1052 Budapest, Váci utca 20.	129 Euro	139 Euro
Roombach Hotel Budapest Center H-1075 Budapest, Rumbach Sebestyén utca 14.	98 Euro	110 Euro
Eurostars Hotel H-1053 Budapest, Kossuth Lajos utca 7-9.	127 Euro	138 Euro
Hotel Erzsébet City Center H-1053 Budapest, Károlyi Mihály utca 11-15.	95 Euro	106 Euro

Social Programmes & Tours

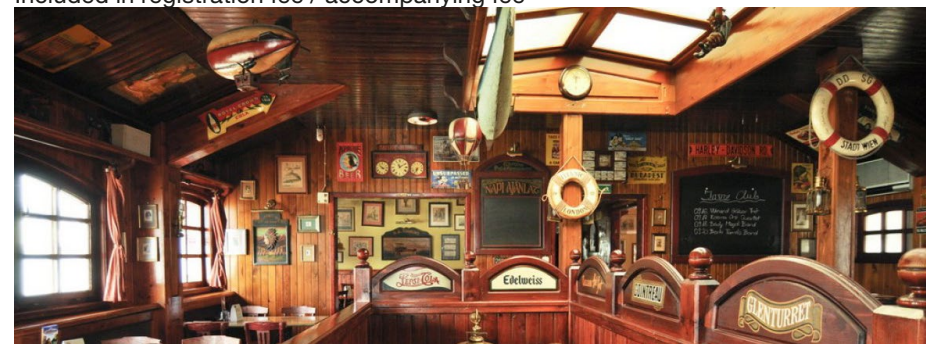
SOCIAL EVENTS

ICE BREAKER

Sunday, June 24, 2018, 18.00-20.00

Venue: Columbus Restaurant and Pub (H-1051 Budapest, Vigadó str. 4)

Included in registration fee / accompanying fee



Refresh yourself after travelling with Hungarian wines and finger food. Come together with your colleagues on the Danube River.

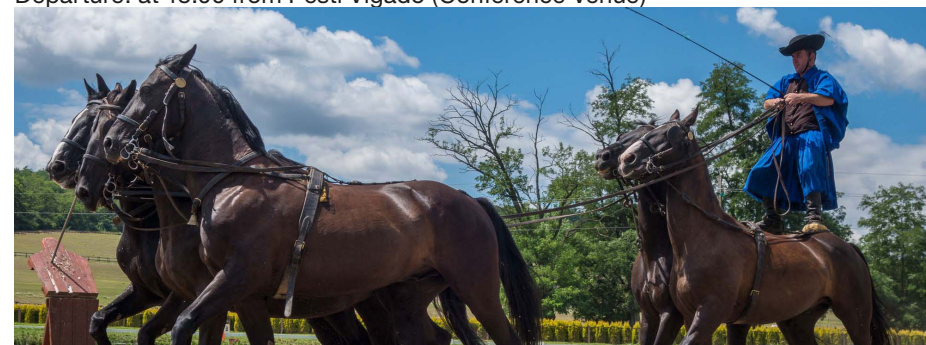
FAREWELL DINNER

Tuesday, June 26, 2018, 19.00-22.00

Venue: Lázár Equestrian Park (Gödöllő)

Included in registration fee / accompanying fee

Departure: at 18.00 from Pesti Vigadó (Conference Venue)



This evening excursion will take us to the picturesque Domony Valley, which is a developing agricultural and entertainment site approximately 35 km from Budapest. This valley features the neighborhood of Gödöllő, an area of environmental protection.

The nine hectares of this beautifully maintained farm is owned by the 12 times horse coach driving World Champion Lázár brothers, and features Hungarian heritage breeds such as the wooly racka sheep and the puli, the corded coated sheepdog. The welcoming atmosphere will feature horses, live music and the best of Hungarian hospitality, dishes and wine. A visit all around the Equestrian Park and a horse show are all included.

TOURS

SIGHTSEEING TOUR

Monday, June 25, 2018 10.00-14.00

Price: 35 EUR/person

This tour is included in accompanies' program!

Departure: at 10.00 from Pesti Vigadó (Conference Venue)



A half-day sightseeing tour highlights the most attractive features of the capital city. Discover the most important sights in Budapest. Let us show you the main attractions on both sides of the River Danube. Walk around the Castle District, enjoy the view and see the top attractions of Pest. The Central Market is a must see for anyone who enjoys the sights, sounds and smells of markets.

Transportation is by bus, English-speaking guide, entrance fees and lunch are included.

PUB CRAWL

Monday, June 25, 2018 20.00-24.00

Price: 35 EUR/person

Departure: at 20.00 from Pesti Vigadó (Conference Venue)



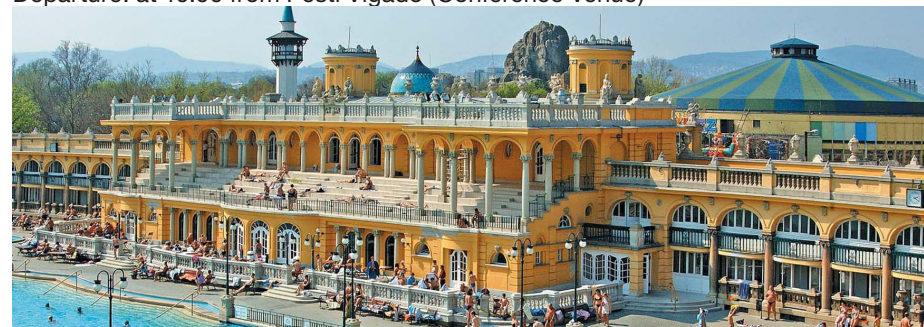
Join us for one of the most unique Budapest experiences, a visit to the famous 'ruin pubs' full of retro decor, strange furniture, and looping art house cinema. Regularly rated as some of the top bars in the world, these former tenements and disused public buildings have been turned into squatter's pubs and entertainment spaces of the new wave. It is a new dimension of night entertainment. English-speaking guide and limited number of drinks are included.

BUDAPEST BATH TOUR – SZÉCHENYI BATH

Wednesday, June 27, 2018 10.00-14.00

Price: 35 EUR/person

Departure: at 10.00 from Pesti Vigadó (Conference Venue)



Enjoy the Széchenyi Bath, which is located in the city park of Budapest is supplied by two thermal water sources with a temperature of 23°C to 38°C. Széchenyi Spa Baths is one of the best and largest spa baths in Europe with its 15 indoor baths and 3 grand outdoor pools. The bath was built in 1913 in Neo-baroque style and is named after István Széchenyi, a 19th century Hungarian politician, theorist and writer. Entrance fees, refreshments are included, please bring appropriate swim wear and towels.

CANCELLATION POLICY

All cancellations and changes must be sent to the Conference office (CongressLine Ltd.) in written form. All refunds will be processed after the CIRP HPC 2018 Conference. Please send your exact bank account details in a written cancellation.

Cancellation Policy of Registration

- 100% refund (minus an administrative fee of 50 Euro)
 - in case of cancellation received before May 25, 2018
- No refund – in case of cancellation received after May 25, 2018

Cancellation policy of Hotel reservation

- 100% refund (minus 30 EUR administrative fee)
 - in case of cancellation received before 18 May, 2018.
- No refund in case of cancellation received after 18 May, 2018.

Cancellation policy of Tours

- 100% refund (minus 15 EUR administrative fee)
 - in case of cancellation received before 18 May, 2018.
- No refund in case of cancellation received after 18 May, 2018.

USEFUL INFORMATION

Recommended taxi company

To reach the hotels or the conference venue and to avoid any inconvenience, please use the official CIRP HPC 2018 taxi company:

City Taxi
Phone: +36 1 211 1111
www.citytaxi.hu

Credit card payment is available in every car of City Taxi. Please note, that all licensed Budapest taxi companies have yellow cars and has the same rates, placed clearly visible on the screens. Airport – Pesti Vigadó route fares should be around 7000-9000 HUF.

Currency

The Forint (HUF), the official national currency, is convertible. The exchange rates applied in Budapest banks, official exchange offices and hotels may vary. All major credit cards are accepted in Hungary in places displaying the emblem at the entrance. Exchange rate: 1 Euro = 318 HUF in June 2018.

Smoking

Smoking is not permitted in the conference venue.

Tipping

Service charges are not added to accounts by hotels and restaurants. You may tip taxi drivers, hotel porters and restaurant waitstaff (up to about 10% of the bill) if you wish to acknowledge exceptional service. At any time, tipping is your choice.

Emergency Details

In an emergency call 112 for Ambulance, Fire Service or Police.

Lost and Found

Any found item may be turned into the Registration Desk. Enquiries about lost items can be directed to the Registration Desk also.

Mobile phones

Please respect the speakers and presenters by ensuring that your mobile phone is switched off during the scientific sessions.

SMARTEVENTS® CONFERENCE APP

CIRP HPC 2018 Conference in your hands - conference app is available for smartphones at Google Play and iTunes.

Check the program, get together and chat with your fellow delegates, send your questions, get important (push) messages from the organisers by uploading the SmartEvent app.

4 STEPS TO GET CONNECTED

Step 1

Download the SmartEvents app from Apple, GooglePlay and Microsoft Stores



Step 2

Open the app on your device



Step 3

Read the following QR code within the app



Step 4

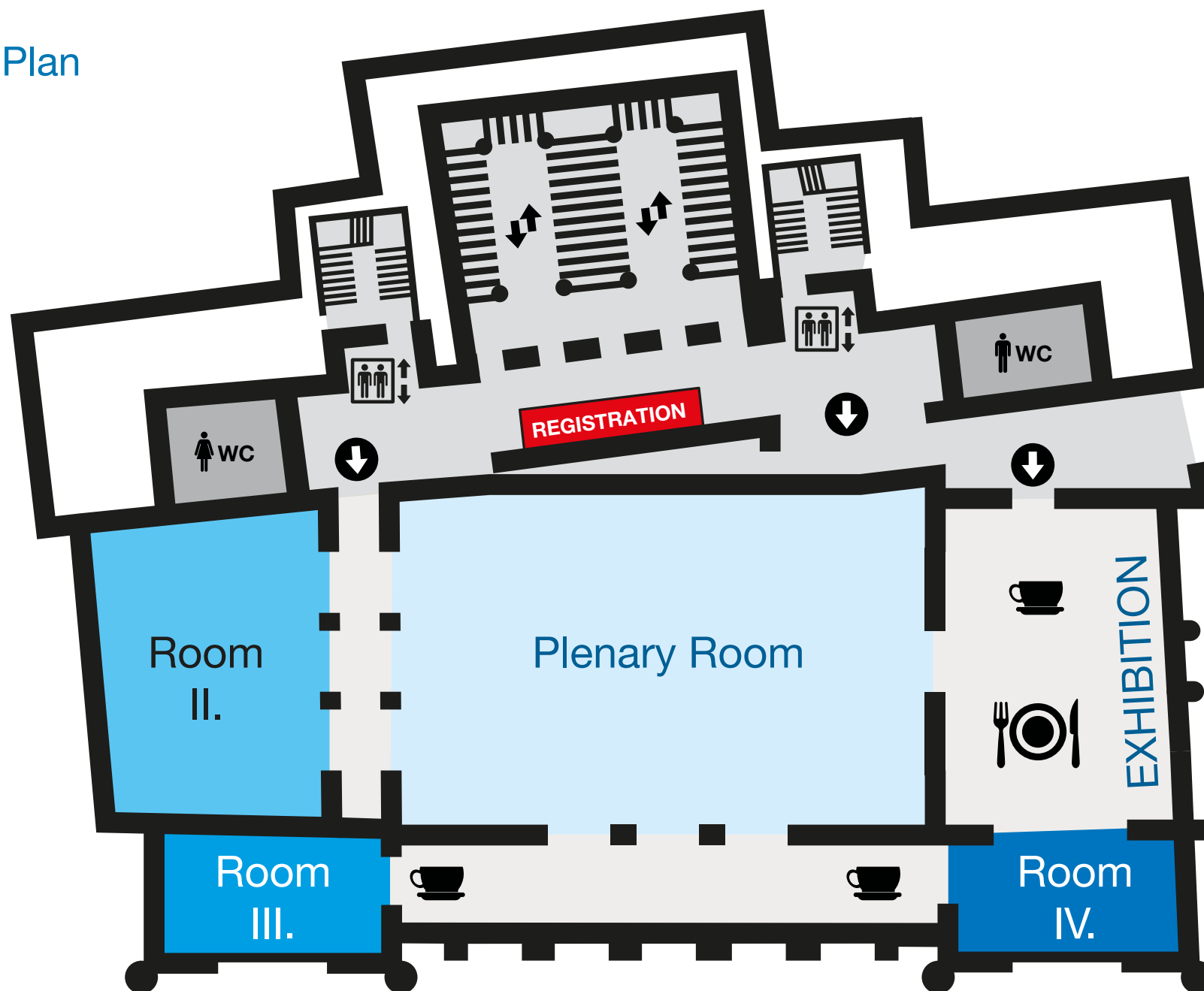
Set your profile by giving your name and e-mail address





Floor Plan

Floor Plan



MONDAY, JUNE 25

	Plenary Room	Room II.	Room III.	Room IV.
08:30 – 09:00	Opening Ceremony			
09:00 – 09:30	Keynote lecture Prof. Gerald Byrne			
09:30 – 10:00	Keynote lecture Prof. Yusuf Altintas			
10:10	Coffee break			
10:30 – 11:50	Cutting 1	Measurement & sensors 1	Machining of non-conventional materials 1	Cutting tools 1
11:50 – 13:30	Lunch			
13:30 – 14:00	Keynote lecture Dr. Rachid M'Saoubi			
14:10 – 15:30	Cutting 2	Chatter 1	Machining of non-conventional materials 2	Abrasive 1
15:30	Coffee break			
15:50 – 17:30	Cutting 3	Chatter 2	Machining of non-conventional materials 3	Cooling solutions 1

TUESDAY, JUNE 26

	Plenary Room	Room II.	Room III.	Room IV.
08:30 – 09:00	Keynote lecture Dr. Jokim Munoa			
09:10 – 10:10	Cutting 4	Abrasive 2	Non-conventional machining 1	Precision machining 1
10:10	Coffee break			
10:30 – 11:50	Cutting 5	Abrasive 3	Machining of non-conventional materials 4	Precision machining 2
11:50 – 13:30	Lunch			
13:30 – 14:00	Keynote lecture Prof. Konrad Wegener			
14:10 – 15:30	Cutting 6	Abrasive 4	Machining of non-conventional materials 5	Sustainable manufacturing
15:30	Coffee break			
15:50 – 17:30	Cutting 7	Cooling solutions 2		Chatter 3

MONDAY, JUNE 25, 2018

08:30 – 09:00 OPENING CEREMONY

Plenary Room

09:00 – 10:00 KEYNOTE LECTURES

Plenary Room

09:00

High Performance Cutting

– Historical Review and New Perspectives

Gerry Byrne¹, Marion Fruechtl²

¹University College Dublin, Dublin, Ireland

²Fraunhofer-Gesellschaft München und Umgebung, Germany

09:30

Virtual High Performance Machining

Yusuf Altintas

The University of British Columbia, Department of Mechanical Engineering, Vancouver, Canada

10:10 – 10:30 Coffee break

10:30 – 11:50 CUTTING 1

Plenary Room

Chair: Gabor Stepan, Rocco Eisseler

10:30

1

Milling force identification from acceleration signals using regularization method based on TSVD in peripheral milling

Chenxi Wang, Xingwu Zhang, Baijie Qiao, Xuefeng Chen, Hongrui Cao
Xi'an Jiaotong University, State Key Laboratory for Manufacturing Systems Engineering, Xi'an, China

10:50

2

Virtual milling force monitoring method based on in-process milling force prediction model to eliminate predetermination of cutting coefficients

Kazuki Kaneko, Isamu Nishida, Ryuta Sato, Keiichi Shirase
Kobe University, Department of Mechanical Engineering, Kobe, Japan

11:10

3

Using an inverse cutting simulation-based method to determine the Johnson-Cook material constants of heat-treated steel

Rocco Eisseler, Konstantin Drewle, Karl Grözinger,
Hans-Christian Moehring
University of Stuttgart, Institute for Machine Tools (IfW), Stuttgart, Germany

WEDNESDAY, JUNE 27

	Plenary Room	Room II.	Room III.	Room IV.
08:50	Measurement & sensors 2			
09:10				
10:10		Abrasive 5	Cutting 8	
10:10	Coffee break			
10:30 – 11:50	Measurement & sensors 3	Abrasive 6	Cutting tools 2	Machines 1
11:50 – 13:30	Lunch			
13:30 – 14:00	Keynote lecture Prof.Gabor Stepan			
14:10 – 15:30	CAD / CAM for HPC	Non-conventional machining 2	Cutting tools 3	Machines 2
15:30	Coffee break			
15:50 – 17:10	Cutting tools 4	Non-conventional machining 3	Micro machining	Machines 3
17:10 – 17:30	Closing Ceremony			



11:30

4

Determination of specific cutting force components and exponents when applying high feed ratesBernhard Karpuschewski¹, János Kundrák², Gyula Varga², István Deszpoth², Dmytro Borysenko³¹Leibniz Institute for Materials Engineering IWT, Bremen, Germany²University of Miskolc, Institute of Manufacturing Science, Miskolc, Hungary³Otto von Guericke University of Magdeburg, Institute of Manufacturing Technology and Quality Management (IFQ), Magdeburg, Germany**10:30 – 11:50 MEASUREMENT & SENSORS 1**

Room II.

Chair: Daisuke Kono, Christoph Baumgart

10:30

5

Evaluation of on-machine measuring method for dynamic stiffness of thin-walled workpiecesTakuma Umezū, Daisuke Kono, Atsushi Matsubara
Kyoto University, Graduate School of Engineering, Kyoto, Japan

10:50

6

On-site estimation of floor stiffness for modelling machine tool supportsDaisuke Kono, Kotaro Mori
Kyoto University, Department of Micro Engineering, Kyoto, Japan

11:10

7

In-process workpiece based temperature measurement in cylindrical grindingChristoph Baumgart, Viktor Heizer, Konrad Wegener
Institute of Machine Tools and Manufacturing (IWF), ETH Zürich, Zürich, Switzerland

11:30

8

Miniaturized interferometric 3-D sensor for shape measurement inside of cutting lathesHao Zhang, Robert Kuschmierz, Jürgen Czarske
TU Dresden, Laboratory of Measurement and Sensor System Techniques, Dresden, Germany**10:30 – 11:50 MACHINING OF NON-CONVENTIONAL MATERIALS 1**

Room III.

Chair: Kaoru Fukushima, Adem Cicek

10:30

9

Development of inclined planetary milling machine with automatic tool axis inclination instrumentKaoru Fukushima, Hidetake Tanaka
Sophia University, Faculty of Science and Technology, Tokyo, Japan

10:50

10

Tool-based inverse determination of material model of Direct Aged Alloy 718 for FEM cutting simulation

Fritz Klocke, Benjamin Döbbeler, Bingxiao Peng, Sebastian Schneider

Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Cutting Technology, Aachen, Germany

11:10

11

High speed turning of Ti6Al4v alloy in micro cutting conditionsKubilay Aslantas¹, Adem Cicek²¹Afyon Kocatepe University, Department of Mechanical Engineering, Afyonkarahisar, Turkey²Yildirim Beyazit University, Mechanical Engineering, Ankara, Turkey

11:30

12

Dry and semi-Dry turning of titanium metal matrix composites (Ti-MMCs)Seyed Ali Niknam¹, Jules Kouam², Victor Songmene², Marek Balazinski³¹Iran University of Science and Technology, School of Mechanical Engineering, Tehran, Iran²École de technologie supérieure, Mechanical Engineering Department, Montreal, Canada³Polytechnique Montréal, Mechanical Engineering Department, Montreal, Canada**10:30 – 11:50 CUTTING TOOLS 1**

Room IV.

Chair: Thomas Lakner, Dirk Schnabel

10:30

13

Influence of cooling nozzle orientation on the machinability of TiAl6V4 and 42CrMo4+QT in rough milling

Fritz Klocke, Benjamin Döbbeler, Thomas Lakner

Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Manufacturing Technology, Aachen, Germany

10:50

14

The effects of cooling/lubricating techniques on cutting performance in micro-milling process of Inconel 718 superalloyKubilay Aslantas¹, Adem Cicek²¹Afyon Kocatepe University, Department of Mechanical Engineering, Afyonkarahisar, Turkey²Yildirim Beyazit University, Department of Mechanical Engineering, Ankara, Turkey

11:10

15

High-pressure cooling in turning of Inconel 625 with ceramic cutting tools

Knut Sørby, Zydrunas Vagnorius

NTNU Norwegian University of Science and Technology, Department of Mechanical and Industrial Engineering, Trondheim, Norway



MONDAY, JUNE 25, 2018

MONDAY, JUNE 25, 2018

HPC¹⁸

11:30

16

Transient simulation of cooling lubricant flow for deep hole drilling processes

Dirk Schnabel¹, Ekrem Özkaya², Dirk Biermann², Peter Eberhard¹

¹University of Stuttgart, Institute of Engineering and Computational Mechanics (ITM), Stuttgart, Germany

²TU Dortmund, Institute of Machining Technology (ISF), Dortmund, Germany

11:50 – 13:30

Lunch

13:30 – 14:00 KEYNOTE LECTURE

Plenary Room

Wear behaviour of ultrahard cutting tool materials in difficult to machine applications

Rachid M'Saoubi

Seco Tools AB, R&D Materials and Technology Development, Fagersta, Sweden

14:10 – 15:30 CUTTING 2

Plenary Room

Chair: Yusuf Altintas, Daniel Bachrathy

14:10

17

Quantification of uncertainty in machining operations based on probabilistic and robust approaches

David Hajdu, Tamas Insperger, Gabor Stepan

Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

14:30

18

Experimental analysis of cutting force reduction during ultrasonic assisted turning of Ti6Al4V

Iñigo Llanos¹, Angela Campa¹, Ariane Iturbe¹, Pedro Jose Arrazola², Oier Zelaieta¹

¹IK4-Ideko, Machining Processes and Production Systems, Elgoibar, Spain

²Mondragon Unibertsitatea, Faculty of Engineering, Mondragon, Spain

14:50

19

Probabilistic prediction of cutting and ploughing forces using extended Kienzle force model in orthogonal turning process

Mehdi Salehi¹, Tony Schmitz², Ruediger Haas³, Jivka Ovtcharova¹, Ryan Copenhaver²

¹Karlsruhe Institute of Technology (KIT), Mechanical Engineering, Karlsruhe, Germany

²University of North Carolina at Charlotte, Mechanical Engineering, Charlotte, USA

³Karlsruhe University of Applied Science, Institute of Materials and Processes (IMP), Karlsruhe, Germany

15:10

20

Gaussian noise process as cutting force model for turning

Henrik T Sykora, Daniel Bachrathy, Gabor Stepan

Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

14:10 – 15:30 CHATTER 1

Room II.

Chair: Martin Postel, Zoltan Dombovari

14:10

21

Evaluation indicators of the runout effects on milling forces and regenerative stability

Jinbo Niu, Jingfu Peng, Ye Ding, LiMin Zhu

Shanghai Jiao Tong University, State Key Laboratory of Mechanical System and Vibration, School of Mechanical Engineering, Shanghai, China

14:30

22

Improved stability predictions in milling through more realistic load conditions

Martin Postel¹, Nevzat Bircan Bugdayci¹, Jérémie Monnin²,

Fredy Kuster¹, Konrad Wegener¹

¹ETH Zürich, IWF, Institute of Machine Tools and Manufacturing, Zürich, Switzerland

²Mikron AgieCharmilles AG, Nidau, Switzerland

14:50

23

An analytical method in modeling of milling process damping considering cutting edge radius

Chang Cao, Xiaoming Zhang, Han Ding

Huazhong University of Science and Technology, School of Mechanical Science and Engineering, Wuhan, China

15:10

24

Milling stability for slowly varying parameters

Zoltan Dombovari¹, Jokim Munoa², Rachel Kuske³, Gabor Stepan¹

¹Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

²IK4-Ideko, Dynamics & Control Department, Elgoibar, Spain

³Georgia Institute of Technology, School of Mathematics, Atlanta, USA

14:10 – 15:30 MACHINING OF NON-CONVENTIONAL MATERIALS 2

Room III.

Chair: Masato Okada, Christopher Praetzas

14:10

25

Evaluation of finished surface of cemented carbide by direct cutting using diamond coated carbide end mill

Masato Okada¹, Reiji Suzuki², Atsuyuki Kondo², Hidehito Watanabe³, Takuya Miura¹, Masaaki Otsu¹

¹University of Fukui, Faculty of Engineering, Fukui, Japan

²University of Fukui, Graduate School of Engineering, Fukui, Japan

³UNION TOOL CO., Tool Engineering Department, Niigata, Japan



14:30

26

Investigation of tool core temperature and mechanical tool load in milling of Ti6Al4VChristoph Czetti¹, Tamara Teppernegg¹, Jonathan Schaefer², Johannes Mayr², Christopher Praetzas³, Eberhard Abele⁴¹CERATIZIT Austria GmbH, R&D Carbide and Coating, Reutte, Austria²CERATIZIT Austria GmbH, R&D Metallurgy and Technology, Reutte, Austria³Institute of Production Management, Technology and Machine Tools (PTW)

- TU Darmstadt, Machining technology, Darmstadt, Germany

⁴Institute of Production Management, Technology and Machine Tools (PTW)

- TU Darmstadt, Head of Institute, Darmstadt, Germany

14:50

27

Influence of the undeformed chip cross section in finishing turning of Inconel 718 with PCBN toolsDiego Infante-Garcia¹, José Díaz-Álvarez², José Luis Cantero¹, Ana Muñoz-Sánchez¹, Maria Henar Miguélez¹¹Universidad Carlos III de Madrid, Department of Mechanical Engineering, Madrid, Spain²Universidad Carlos III de Madrid, Department of Bioengineering and Aerospace, Madrid, Spain

15:10

28

High performance cutting of Titanium alloy based on the thermo-mechanical coupling effectXiaodong Zhang, Ming Luo, Dinghua Zhang

Key Laboratory of Contemporary Design and Integrated Manufacturing Technology,

Ministry of Education, Northwestern Polytechnical University, Xi'an, China

14:10 – 15:30 **ABRASIVE 1**

Room IV.

Chair: Marie Stará, Victor Songmene

14:10

29

Influence of servo characteristics on crack generation in ultra-precision grinding of optical glass lenses

Takumi Suetomi

Keio University, Department of System Design Engineering, Yokohama, Japan

14:30

30

Possibilities of robot application for glass mechanical frosting by an abrasive composite brushMichal Starý¹, František Novotný¹, Marcel Horák¹, Marie Stará²¹Technical university of Liberec, The Institute for Nanomaterials, Advanced Technology and Innovation, Liberec, Czech Republic²Technical university of Liberec, Faculty of Mechanical Engineering, Liberec, Czech Republic

14:50

31

Granite polishing: Effects of polishing parameters and tool paths on part quality and dust emission

Victor Songmene

Ecole de technologie supérieure, ETS, Department of Mechanical Engineering, Montreal, Canada

15:10

32

Surface quality of Zirconia (ZrO₂) parts in shear-thickening high-efficiency polishing

Min Li

Hunan University of Science and Technology, Intelligent Manufacturing Institute, Xiangtan, China

15:30 – 15:50

Coffee break

15:50 – 17:30

CUTTING 3

Plenary Room

Chair: Daniel Hinzmann, Anish Roy

15:50

33

Effect of morphological evolution of serrated chips on surface formation during high speed cutting Ti6Al4V

Xiang Xu, Jun Zhang, Hongguang Liu, Yutong Qi, Zhechao Liu, Wanhua Zhao

Xi'an Jiaotong University, State Key Laboratory for Manufacturing Systems Engineering, Xi'an, China

16:10

34

Interfacial effects on the dynamic stresses in high speed cutting of heterogeneous materials

Yong He, Jun Zhang, Yifei Jiang, Zhechao Liu, Yutong Qi, Wanhua Zhao

Xi'an Jiaotong University, State Key Laboratory for Manufacturing Systems Engineering, Xi'an, China

16:30

35

High-speed camera measurements in the mechanical analysis of machining

Szabolcs Berezhvai, Daniel Bachrathy, Gabor Stepan

Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

16:50

36

3D Eulerian Lagrangian finite element Modelling of end millingYifan Gao¹, Jeong Hoon Ko², Heow Pueh Lee¹¹National University of Singapore, Department of Mechanical Engineering, Singapore²Singapore Institute of Manufacturing Technology, Machining Technology Group, Singapore



17:10

37

Effect of hybrid machining on structural integrity of aerospace-grade materialsWei Bai¹, Anuj Bisht², Anish Roy³, Satyam Suwas², Ronglei Sun⁴, Vadim V. Silberschmidt³, Wei Ba³¹The State Key Lab of Digital Manufacturing Equipment and Technology, School of Mechanical Science and Engineering, Huazhong University of Science and Technology, Wuhan, China²Indian Institute of Science, Department of Materials Engineering, Bangalore, India³Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, Leicestershire, United Kingdom⁴The State Key Lab of Digital Manufacturing Equipment and Technology, School of Mechanical Science and Engineering, Huazhong University of Science and Technology, Wuhan, India**15:50 – 17:30 CHATTER 2**

Room II.

Chair: Juho Ratava, Tamas Insperger

15:50

38

A receptance coupling approach to optimally tune and place absorbers on boring bars for chatter suppressionAnkit Bansal, Mohit Law

Indian Institute of Technology Kanpur, Department of Mechanical Engineering, Kanpur, India

16:10

39

On process damping induced by vibration-dependency of cutting direction in millingTamas G. Molnar, Daniel Bachrathy, Tamas Insperger, Gabor Stepan
Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

16:30

40

Chatter suppression in finish turning of thin-walled cylinder: model of tool workpiece interaction and effect of spindle speed variation

Jiří Falta, Miroslav Janota, Matěj Sulitka

Czech Technical University in Prague, Faculty of Mechanical Engineering, Department of Production Machines and Equipment, Prague, Czech Republic

16:50

41

Stability of turning process with tool subjected to compression

Bence Beri, Gabor Stepan

Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

17:10

42

An empirical comparison of chatter classification methods in turning

Juho Ratava, Behnam Ghalamchi, Mojtaba Mubarakhi,

Jussi Sopanen, Juha Varis

Lappeenranta University of Technology, Department of Mechanical Engineering, Lappeenranta, Finland

15:50 – 17:30 MACHINING OF NON-CONVENTIONAL MATERIALS 3

Room III.

Chair: Ramy Abdallah, Alborz Shokrani

15:50

43

Prediction of thrust force and torque in drilling of glass fiber reinforced plastic using mechanistic force model approachVarsharani Gaikhe¹, Yogesh Gaikhe², Jeet Patil³¹Pimpri Chinchwad Collage of Engineering, Pune, Mechanical Engineering, Pune, India²Indian Institute of Technology Mumbai, Mechanical Engineering, Mumbai, India³Shri Guru Gobind Singhji Institute of Engineering and Technology, Production Engineering, Nanded, India

16:10

44

Experimental study towards determination of critical feed for minimisation of delamination damage in flax natural fibre compositesAiman Akmal Abdul Nasir¹, Azwan Iskandar Azmi², Tan Chye Lih¹, Norshah Aizat Shuaib²¹Universiti Malaysia Perlis, School of Manufacturing Engineering, Kangar, Perlis, Malaysia²Universiti Malaysia Perlis, Faculty of Engineering Technology, Kangar, Perlis, Malaysia

16:30

45

A feasibility study on wire electrical discharge machining of carbon fibre reinforced plastic composites

Ramy Abdallah, Sein Leung Soo, Richard Hood

University of Birmingham, Department of Mechanical Engineering, Birmingham, United Kingdom

16:50

46

Edge trimming of carbon fibre reinforced plasticChloe Cunningham, Alborz Shokrani, Vimal Dhokia

University of Bath, Department of Mechanical Engineering, Bath, United Kingdom

17:10

47

3D molecular dynamics model for nano-machining of fcc and bcc materialsNikolaos Karkalos¹, Angelos Markopoulos¹, János Kundrák²¹National Technical University of Athens, School of Mechanical Engineering, Athens, Greece²University of Miskolc, Institute of Manufacturing Science, Miskolc, Hungary



MONDAY, JUNE 25, 2018

HPC¹⁸

15:50 – 17:30 **COOLING SOLUTIONS 1**

Room IV.

Chair: Nico Hanenkamp, Daniel Bachrathy

- 15:50 **48**
Modification of surface morphology during cryogenic turning of metastable austenitic steel AISI 347 at different parameter combinations with constant CO2 consumption per cut
Hendrik Hotz¹, Benjamin Kirsch¹, Steven Becker², Erik Von Harbou³, Ralf Müller², Jan C. Aurich¹
¹University of Kaiserslautern, Institute for Manufacturing Technology and Production Systems, Kaiserslautern, Germany
²University of Kaiserslautern, Institute of Applied Mechanics, Kaiserslautern, Germany
³University of Kaiserslautern, Laboratory of Engineering Thermodynamics, Kaiserslautern, Germany
- 16:10 **49**
Residual stresses and cutting forces in cryogenic milling of Inconel 718
Gleiton De Paula Oliveira¹, Maria Cindra Fonseca¹, Anna Carla Araujo²
¹Universidade Federal Fluminense, Department of Mechanical Engineering, Niteroi, Brazil
²Universidade Federal do Rio de Janeiro, Mechanical Engineering Department, Rio de Janeiro, Brazil
- 16:30 **50**
Machinability of Inconel 718 using hybrid cryogenic-MQL lubricoolant
Alborz Shokrani
University of Bath, Department of Mechanical Engineering, Bath, United Kingdom
- 16:50 **51**
Hybrid supply system for conventional and CO2-based cryogenic cooling
Nico Hanenkamp, Daniel Gross
University Erlangen-Nuremberg, Mechanical Engineering, Erlangen, Germany
- 17:10 **52**
An experimental study of the white layer formation during cryogenic assisted hard machining of AISI 52100
Guang-chao Nie, Xiao-ming Zhang, Dong Zhang, Han Ding
Huazhong University of Science and Technology, School of Mechanical Science and Engineering, Wuhan, China

TUESDAY, JUNE 26, 2018

08:30 – 09:00 **KEYNOTE LECTURE**

Plenary Room

Methods to increase damping in machine tools

Jokin Munoa
Dynamics and Control, IK4-Ideko, 20870 Elgoibar, Basque Country, Spain

09:10 – 10:10 **CUTTING 4**

Plenary Room

Chair: Alessandro Checchi, Dan Östling

- 9:10 **53**
The effect of machining parameters on cutting force and tool wear in machining nickel titanium shape memory alloy ASTM F2036 under Minimum Quantity Nanolubricants
Ahmad Nabil Mohd Khalil¹, Azwan Iskandar Azmi², Muhammad Nasir Murad¹, Muhammad Asyraf Mahboob Ali¹
¹Universiti Malaysia Perlis, School of Manufacturing Engineering, Kangar, Perlis, Malaysia
²Universiti Malaysia Perlis, Faculty of Engineering Technology, Kangar, Perlis, Malaysia
- 9:30 **54**
A mechanistic model for the prediction of cutting forces in the face-milling of ductile spheroidal cast iron components for the wind energy sector
Alessandro Checchi, Giuliano Bissacco, Hans Nøgaard Hansen
Technical University of Denmark, Department of Mechanical Engineering, Kgs. Lyngby, Denmark
- 9:50 **55**
Cutting process monitoring with an instrumented boring bar measuring cutting force and vibration
Dan Östling¹, Tormod Jensen¹, Mathias Tjomsland¹, Oddvar Standal¹, Terje Mugaas²
¹Sandvik Teeness AS, R&D Silent Tools, Trondheim, Norway
²SINTEF Digital, Mathematics and Cybernetics, Trondheim, Norway

09:10 – 10:10 **ABRASIVE 2**

Room II.

Chair: Jack Palmer, Zoltan Dombovari

- 09:10 **56**
The influence of abrasive grit morphology on wheel topography and grinding Performance
Jack Palmer¹, Donka Novovic², David Curtis³, Hassan Ghadbeigi¹
¹University of Sheffield, Department of Mechanical Engineering, Sheffield, United Kingdom
²Rolls-Royce plc., Manufacturing Technology, Derby, United Kingdom
³University of Sheffield, Advanced Manufacturing Research Centre, Sheffield, United Kingdom



09:30

57

Surgical diamond wheels for minimally invasive surgery in bone resection under saline supply

Takeru Mizutani, Toshiyuki Enomoto, Urara Satake
Osaka University, Department of Mechanical Engineering, Osaka, Japan

09:50

58

A novel approach to roundness generation analysis in centerless through-feed grinding in consider of decisive parameters of grinding gap by use of 3D kinematic simulation

Dirk Bähre¹, Mohsen Hassanzadeh Otaghvar¹, Bernhard Hahn², Harald Werner², Hesam Omiditabrizi³

¹Institute of Production Engineering (LFT), Saarland University, Faculty of Science and Technology, Saarbrücken, Germany

²Robert Bosch GmbH, Manufacturing, Buhl, Germany

³Karlsruhe Institute of Technology (KIT), Department of Mechanical Engineering, Karlsruhe, Germany

09:10 – 10:10 NON-CONVENTIONAL MACHINING 1

Room III.

Chair: Shunya Kaibu, Kaveh Rahimzadeh Berenji

09:10

59

Study on cutting marks by turn-mill process

Shunya Kaibu
Osaka Institute of Technology, Department of Mechanical Engineering, Osaka, Japan

09:30

60

Effects of process parameters during turn-milling of microstructured surfaces on the coefficient of static friction

Roman Funke, Andreas Schubert
Chemnitz University of Technology, Professorship Micromanufacturing Technology, Chemnitz, Germany

09:50

61

Investigating high productivity conditions for turn-milling in comparison to conventional turning

Kaveh Rahimzadeh Berenji, Mehmet Emre Kara, Erhan Budak
Sabancı University, Faculty of Engineering and Natural Sciences, Istanbul, Turkey

09:10 – 10:10 PRECISION MACHINING 1

Room IV.

Chair: Daniel Bachrathy, Timo Dörgeloh

09:10

62

Automated microfluidic balancing system for high speed air-bearing spindles

Timo Dörgeloh, Oltmann Riemer, Ekkard Brinksmeier
Laboratory for Precision Machining (LFM), University of Bremen, Bremen, Germany

09:30

63

Examination and adjustment of the bearing pattern in case of helicoid drives

Zsuzsa Balajti
University of Miskolc, Institute of Mathematics, Miskolc, Hungary

09:50

64

Finishing of Free Form Surfaces with an Optimized Z-Constant Machining Strategy

Mohamed Bey
Centre de Développement des Technologies Avancées - CDTA -, Division Productique et Robotique - DPR - Algiers, Algeria

10:10 – 10:30 Coffee break

10:30 – 11:50 CUTTING 5

Plenary Room

Chair: Tibor Szalay, Rachid M'Saoubi

10:30

65

Limits to simplified calculation of uncut chip thickness in milling

Gregor Smyczek, Grigory Rotshteyn, Florian Degen
Fraunhofer Institute for Production Technology, IPT, High Performance Cutting, Aachen, Germany

10:50

66

Effect of cutting parameters on section-borders of the empirical specific cutting force model for cutting with micro-sized uncut chip thickness

István Biró, Tibor Szalay, Norbert Geier
Budapest University of Technology and Economics, Department of Manufacturing Science and Engineering, Budapest, Hungary

11:10

67

Precise estimation of cutting force coefficients and cutter runout in milling using differential evolution algorithm

Ding Chen
Huazhong University of Science and Technology, School of Mechanical Science and Engineering, Wuhan, China



11:30

68

An optimization methodology for material databases to improve cutting force predictions when milling martensitic stainless steel JETHETE-M152

Patxi Xabier Aristimuño¹, Xabier Lazkano¹, Andres Sela¹, Rosa Basagoiti², Pedro Jose Arrazola¹

¹Mondragon Unibertsitatea, Mechanical and Manufacturing Department, Mondragon, Spain

²Mondragon Unibertsitatea, Electronics and Computer Science Department, Mondragon, Spain

10:30 – 11:50 ABRASIVE 3

Room II.

Chair: Erhan Budak, Daniel Bachrathy

10:30

69

Modeling of the temperature field in the workpiece external zone as a function of the grinding wheel topography

Christian Wrobel

Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Manufacturing Technology, Aachen, Germany

10:50

70

Full coupling effect in fluid hydrodynamic fixed abrasive grinding

Pengfei Liu, Bin Lin

Tianjin University, Department of Mechanical Engineering, Tianjin, China

11:10

71

Grinding temperature modeling based on micro interaction of wheel-workpiece

Hamid Jamshidi, Erhan Budak

Sabancı University, Faculty of Engineering and Natural Sciences, Istanbul, Turkey

11:30

72

Simulation of workpiece surface roughness after flat grinding by electroplated wheel

Mohammad Rabiey¹, Lee Joseph²

¹University of applied Science Rapperswil, Institute of material technic and polymer processing, Rapperswil, Switzerland

²Nanyang Technological University, Department of Mechanical Engineering, Singapore, Singapore

10:30 – 12:10 MACHINING OF NON-CONVENTIONAL MATERIALS 4

Room III.

Chair: Xavier Rimpault, Kevin Kerrigan

10:30

73

Effect of curing pressure on the properties and machinability of carbon fiber composite

Pierre Coulon, Jean-François Chatelain, Martine Dubé,

Xavier Rimpault

École de technologie supérieure, Department of Mechanical Engineering, Montreal, Canada

10:50

74

Improvement of boring quality of CFRP and evaluation of tool wear by inclined planetary milling

Hironori Sasai, Hidetake Tanaka

Sophia University, Faculty of Science and Technology, Tokyo, Japan

11:10

75

Wet vs dry CFRP drilling: Influence of cutting fluid on tool performance

Kevin Kerrigan, Richard Scaife

University of Sheffield, Advanced Manufacturing Research Centre, Sheffield, United Kingdom

11:30

76

Industry supported experimental studies on drilling of thick multi-directional GFRP composite material

Navneet Khanna, Krupansh Desai, Arjun Sheth

IITRAM, Mechanical Engineering Department, Ahmedabad, India

11:50

77

Design and development of an ultrasonic vibration assisted turning system for machining bioabsorbable magnesium alloys

Eugenio Di Iorio, Rachele Bertolini, Stefania Bruschi, Andrea Ghiotti

University of Padova, Department of Industrial Engineering, Padova, Italy



TUESDAY, JUNE 26, 2018

TUESDAY, JUNE 26, 2018

HPC¹⁸

10:30 – 11:50 PRECISION MACHINING 2

Room IV.

Chair: Denes Takács, Sven Klein

10:30

78

Analysis of the dynamics of a honing gimbal by using two friction models in long stroke honing

Sven Klein, Manuel Greulich, Dirk Bähre
Institute of Production Engineering (LFT), Saarland University, Department of Mechanical Engineering, Saarbrücken, Germany

10:50

79

Interdependence between tool misalignment and cutting forces in ultraprecise single point inverted cutting

Nicolas Milliken¹, O. Remus Tutunea-Fatan²,
Evgueni V. Bordatchev¹
¹National Research Council of Canada, Automotive and Surface Transportation Research Center, London, Canada
²Western University, Mechanical and Materials Engineering, London, Canada

11:10

80

Prediction and modeling of thermal distortion in sequential MQL drilling of AISi7 cylindrical parts

Sangil Han¹, Pierre Faverjon², Frédéric Valiorgue¹, Joël Rech¹
¹Ecole Nationale d'Ingénieurs de Saint Etienne, Laboratoire de Tribologie et Dynamique des Systèmes, Saint Etienne, France
²PCI SCEMM-Tongtai Group, PCI SCEMM, Saint Etienne, France

11:30

81

Topography of the machined surface in high performance face milling

János Kundrák, Csaba Felhő
University of Miskolc, Institute of Manufacturing Science, Miskolc, Hungary

11:50 – 13:30 Lunch

13:30 – 14:00 KEYNOTE LECTURE

Plenary Room

Dawn of new machining concepts

Konrad Wegener¹, Thomas Gittler², Lukas Weiss²
¹Institute of Machine Tools and Manufacturing (IWF), ETH Zürich, Switzerland
²inspire AG, Zürich, Switzerland

14:10 – 15:30 CUTTING 6

Plenary Room

Chair: Daniel Bachrathy, Zoltan Dombovari

14:10

82

Constitutive model incorporating the strain-rate and state of stress effects for machining simulation of titanium alloy Ti6Al4V

Wenyu Cheng¹, José Outeiro², Jean-Philippe Costes²,
Lamice Denguir², Rachid M'Saoubi³, Habib Karaoui⁴,
Viktor Astakhov⁵, François Auzanab⁶
¹Ecole Nationale Supérieure d'Arts et Métiers, LaBoMaP, Cluny, France
²Arts et Métiers ParisTech, LaBoMaP, Cluny, France
³Seco Tools, R&D Material and Technology Development, Saarbrücken, Sweden
⁴Safran Tech, Research & Technology Center, Research and Technology Center, Fagersta, France
⁵Production Service Management Inc., Tool manager, Michigan, USA
⁶Seco Tools, R&D Material and Technology Development, Bourges, France

14:30

83

Mechanism study on adiabatic shear fracture induced isolated segment formation during high-speed machining

Liyao Gu, Nan Cui
Southwest Jiaotong University, School of Mechanical Engineering, Chengdu, China

14:50

84

Phenomenological study of chip flow/formation and unified cutting force modelling during Ti6Al4V alloy turning operations

Iheb Cherif¹, Théo Dorlin¹, Bertrand Marcon¹, Guillaume Fromentin¹,
Habib Karaoui²
¹Arts et Métiers ParisTech, LaBoMaP, Cluny, France
²Safran Tech, Research & Technology Center, Paris, France

15:10

85

Laser scanned patterns of machined surfaces

Adam K Kiss, Daniel Bachrathy, Gabor Stepan
Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

**14:10 – 15:30 ABRASIVE 4**

Room II.

Chair: Florian Morczinek, Konrad Wegener

14:10

86**Characterization of maraging steel 300 internal surface created by selected laser melting (SLM) after abrasive flow machining (AFM)**Marie-Salome Duval-Chaneac¹, Sangil Han¹, Christophe Claudin¹, Ferdinando Salvatore¹, Julien Bajolet², Joël Rech¹¹Ecole Nationale d'Ingénieurs de Saint Etienne, Laboratoire de Tribologie et Dynamique des Systèmes, Saint Etienne, France²IPC, Centre Technique d'Innovation en Plasturgie, Bellignat, France

14:30

87**Flow field analysis of the thin fluid film in disc hydrodynamic polishing**

Zhong-Chen Cao, Bin Lin, Xiang-Min Jiang, Yan Li

Key Laboratory of Advanced Ceramics and Machining Technology, Ministry of Education, Tianjin University, Mechanical Engineering, Tianjin, China

14:50

88**Suspension technology for abrasive waterjet (AWJ) cutting of ceramics**

Florian Morczinek

Chemnitz University of Technology, Machining Processes and Production Systems, Chemnitz, Germany

15:10

89**Experimental investigation of tool wear in electroplated diamond wire sawing of silicon**

Uygar Pala, Stefan Süssmaier, Fredy Kuster, Konrad Wegener

ETH Zürich, IWF, Institute of Machine Tools and Manufacturing, Zürich, Switzerland

14:10 – 15:30 MACHINING OF NON-CONVENTIONAL MATERIALS 5

Room III.

Chair: Lukas Seeholzer, Hans-Christian Moehring

14:10

90**Trochoid milling of carbon fibre-reinforced plastics (CFRP)**

Norbert Geier, Tibor Szalay, István Biró

Budapest University of Technology and Economics, Department of Manufacturing Science and Engineering, Budapest, Hungary

14:30

91**Fundamental analysis of the cutting edge micro-geometry in orthogonal machining of unidirectional Carbon Fibre Reinforced Plastics (CFRP)**

Lukas Seeholzer, Robert Voss, Frank Grossenbacher, Friedrich Kuster, Konrad Wegener

ETH Zürich, IWF, Institute of Machine Tools and Manufacturing, Zürich, Switzerland

14:50

92**Ultrasonically assisted drilling of aerospace CFRP/Ti stacks**P. Y. Onawumi¹, E. Merson², A. Roy¹, V. V. Silberschmidt¹¹Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, Leicestershire, United Kingdom²Sandvik Coromant, Sandvik AB, Sheffield, United Kingdom

15:10

93**Material failure detection for intelligent process control in CFRP machining**

Hans-Christian Moehring, Sarah Eschelbacher, Martin Kimmelman

University of Stuttgart, Institute for Machine Tools (IfW), Stuttgart, Germany

14:10 – 15:30 SUSTAINABLE MANUFACTURING

Room IV.

Chair: Luka Sterle, Tamas Insuperger

14:10

94**Performance of supercritical carbon dioxide (scCO₂) mixed with oil-on-water (OoW) cooling in high-speed milling of 316L stainless steel**Yaohui Yuan¹, Chengyong Wang¹, Jianzhang Yang¹, Lijuan Zheng¹, Weiqiang Xiong²¹Guangdong University of Technology, College of Mechanical and Electrical Engineering, Guangzhou, China²DG Armoline Energy-efficient and Eco-friendly Tech Co., Ltd, General manager, Dongguan, China

14:30

95**Sustainable optimization of dry turning of stainless steel based on energy consumption and machining cost**

Ahmad Razlan Yusoff

Universiti Malaysia Pahang, Manufacturing Engineering, Pekan, Malaysia



14:50

96

Performance evaluation of solid lubricants under machining-like tribological conditions

Luka Sterle

University of Ljubljana, Faculty of Mechanical Engineering, Department for Management of Manufacturing Technologies, Ljubljana, Slovenia

15:10

97

Process for the machine specific analysis and modelling of the technology based energetical demand forecasts

Robert Eckardt, Christina Pietschmann, Leif Goldhahn

University of Applied Sciences Mittweida, Department of Engineering Sciences, Mittweida, Germany

15:30 – 15:50

Coffee break

15:50 – 17:30 CUTTING 7

Plenary Room

Chair: Jose Outerio, Xavier Rimpault

15:50

98

Milling of fir-tree slots in Allvac 718 plusFritz Klocke, Benjamin Doebele, Marvin Binder, Martin Seimann

Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Cutting Technology, Aachen, Germany

16:10

99

On the optimization of the cutting conditions and tool geometry for the improvement of OFHC copper corrosion resistanceLamice Denguir, Jose Outerio

Ecole Nationale Supérieure d'Arts et Métiers, LaBoMaP, Cluny, France

16:30

100

Workpiece subsurface temperature study during aluminum skin milling in slotting and rampingXavier Rimpault¹, Alexandre Il¹, Jean-Francois Chatelain¹,Jean-Francois Lalonde², Marek Balazinski³¹École de technologie supérieure, Department of Mechanical Engineering, Montreal, Canada²Bombardier Aerospace, Aerospace, Montreal, Canada³Polytechnique Montréal, Department of Mechanical Engineering, Montreal, Canada

16:50

101

High performance cutting of Zr-based bulk metallic glass: a review of chip formation

Feng Ding, Chengyong Wang, Tao Zhang, Lijuan Zheng,

Xuguang Zhu

Guangdong University of Technology, Institute of Manufacturing Technology, Guangzhou, China

17:10

102

Mechanical study in drilling of heat resistant austenitic stainless steelRabiae Arif¹, Guillaume Fromentin¹, Frédéric Rossi¹,Bertrand Marcon¹, Patrick Blandenet²¹Arts et Métiers ParisTech, LaBoMaP, Cluny, France²Saint Jean Tooling, Tool Engineering Department, Saint Jean d'Ardières, France**15:50 – 17:30****COOLING SOLUTIONS 2**

Room II.

Chair: Oleksandr Gutnichenko, Gaetano M. Pittala

15:50

103

Specific cutting energy of Inconel 718 under dry, chilled-air and minimal quantity nanolubricantsMuhammad Asyraf Mahboob Ali¹, Azwan Iskandar Azmi²,Ahmad Nabil Mohd Khalil¹¹Universiti Malaysia Perlis, School of Manufacturing Engineering, Kangar, Perlis, Malaysia²Universiti Malaysia Perlis, Faculty of Engineering Technology, Kangar, Perlis, Malaysia

16:10

104

Numerical modelling of part distortions due to thermo-mechanical effects with MQL machining applied to head-cylinders in an automotive production line contextLounès Amran Illoul¹, Philippe Lorong¹, Théo Dorlin²,Patrice Carras²¹Arts et Métiers ParisTech, PIMM Laboratory, Paris, France²Renault Group, Moving Parts Machining Processes Team, Guyancourt, France

16:30

105

Influence of graphite nanoadditives to vegetable-based oil on machining performance when MQCL assisted hard turningOleksandr Gutnichenko¹, Volodymyr Bushlya¹, Sverker Behagen²,Jan-Eric Stahl¹¹Lund University, Department of Mechanical Engineering, Lund, Sweden²ACCU-Svenska AB, Manufacturing, Vasteros, Sweden

16:50

106

Cutting fluid application for titanium alloys Ti-6Al-4V and Ti-10V-2Fe-3Al in a finish turning processChris Taylor¹, Samantha Giovana Abrego Hernandez²,Matthew Marshall², Matt Broderick¹¹University of Sheffield, Advanced Manufacturing Research Centre, Sheffield, United Kingdom²University of Sheffield, Department of Mechanical Engineering, Sheffield, United Kingdom

17:10

107

A study of the effect of CO2 cryogenic coolant in end milling of Ti-6Al-4V

Gaetano M. Pittala

Sandvik Coromant, Rovereto, Italy



TUESDAY, JUNE 26, 2018

HPC¹⁸

15:50 – 17:30 **CHATTER 3**

Room IV.

Chair: Giovanni Totis, Andreas Otto

- 15:50 **108**
Stability of variable helix milling: model validation using scaled experiments
Luis Ureña¹, Neil Sims¹, Erdem Ozturk²
¹University of Sheffield, Mechanical Engineering, Sheffield, United Kingdom
²University of Sheffield, AMRC, Sheffield, United Kingdom
- 16:10 **109**
Stability analysis in milling by taking into account the influence of forced vibrations on the actual tool-workpiece engagement conditions
Giovanni Totis¹, Tamas Insperger², Gabor Stepan², Marco Sortino¹
¹University of Udine, Polytechnic Department of Engineering and Architecture, Udine, Italy
²Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary
- 16:30 **110**
Error analysis for time-domain methods in milling stability prediction
Tao Huang, Xiaoming Zhang, Han Ding
Huazhong University of Science and Technology, School of Mechanical Science and Engineering, Wuhan, China
- 16:50 **111**
The effect of torsional vibrations on metal cutting dynamics
Andreas Otto¹, Martin Kolouch², Günter Radons¹
¹Chemnitz University of Technology, Institute of Physics, Chemnitz, Germany
²Fraunhofer IWU, Machine Tools, Chemnitz, Germany
- 17:10 **112**
Time domain modelling for machining stability of high aspect ratio workpiece
Jeong Hoon Ko
Singapore Institute of Manufacturing Technology, Machining Technology Group, Singapore, Singapore
- 19:00 **Farewell Dinner**
Departure: at 18:00 Budapest Vígadó (Conference Venue)

WEDNESDAY, JUNE 27, 2018

08:50 – 10:10 **MEASUREMENT & SENSORS 2**

Plenary Room

Chair: Jan Berthold, Denes Takacs

- 08:50 **113**
New methods for in-process identification of modal parameters in milling
Mahdi Eynian¹, Stefan Cedergren², Martin Magnevall³, Anders Wretland², Mikael Lundblad³
¹University West, Department of Engineering Science, Trollhättan, Sweden
²GKN Aerospace Engine Systems AB, Research and Technology Center, Trollhättan, Sweden
³Sandvik Coromant, Metal Cutting Modeling, Sandviken, Sweden
- 09:10 **114**
Identification of modal parameters of machine tools during cutting by operational modal analysis
Jan Berthold¹, Martin Kolouch², Volker Wittstock¹, Matthias Putz³
¹Chemnitz University of Technology, Professorship of Machine Tools and Forming Technology, Chemnitz, Germany
²Fraunhofer IWU, Machine Tools, Chemnitz, Germany
³Fraunhofer IWU, Head of Institute, Chemnitz, Germany
- 09:30 **115**
Optimization of cutting parameters for cutting force minimization in helical ball end milling of Inconel 718 by using genetic algorithm
Varsharani Gaikhe¹, Raju Pawade², Jambeswar Sahu³
¹Pimpri Chinchwad Collage of Engineering, Pune, Mechanical Engineering, Pune, India
²Dr. Babasaheb Ambedkar Technological University, Lonere, Mechanical Engineering Department, Raigad, India
³IIT Mumbai, Mechanical Engineering, Mumbai, India
- 09:50 **116**
Ball shooting tests for identification of modal parameter variation in rotating main spindles
Denes Takacs¹, Richard Wohlfart¹, Akos Miklos¹, Gabor Krajnyak¹, Andras Toth², Gabor Stepan¹
¹Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary
²Budapest University of Technology and Economics, Department of Manufacturing Science and Engineering, Budapest, Hungary



WEDNESDAY, JUNE 27, 2018

09:10 – 10:10 ABRASIVE 5

Room II.

Chair: Albrecht Hänel, Konrad Wegener

09:10

117

Efficient modelling of machine structure dynamics for high performance dry grinding

Michal Kuffa¹, Daniel Spescha², Natanael Lanz¹, Konrad Wegener¹

¹ETH Zürich, IWF, Department of Mechanical and Process Engineering, Zürich, Switzerland

²Inspire AG ETH Zürich, Department of Mechanical and Process Engineering, Zürich, Switzerland

09:30

118

Predictive modelling of surface roughness for double vibropolishing in trough system

Joselito Yam Alcaraz¹, Amey Vivek Mankar², Kunal Ahluwalia³,

Rijul Mediratta³, Ketav Mihir Majumdar³, S.H. Yeo³

¹Nanyang Technological Univ, School of Mechanical and Aerospace Engineering, SGP, Singapore

²IIT Mumbai, Department of Mechanical Engineering, Mumbai, India

³Nanyang Technological University, School of Mechanical and Aerospace Engineering, SGP, Singapore

09:50

119

Investigation on the grinding characteristics of binderless nanocrystalline cubic boron nitride (BNNC) as cutting material for the machining of hardened steels and superalloys

Albrecht Hänel¹, Manuel Hasterok², Marcus Schwarz²,

Christian Schimpf³, Andreas Nestler¹, Alexander Brosius¹,

Edwin Kroke²

¹TU Dresden, Institute of Manufacturing Science and Engineering (IF), Dresden, Germany

²TU Bergakademie Freiberg, Institute of Inorganic Chemistry, Freiberg, Germany

³TU Bergakademie Freiberg, Institute of Materials Science, Freiberg, Germany

09:10 – 10:10 CUTTING 8

Room III.

Chair: Giovanna Martínez-Arellano, Victor Songmene

09:10

120

The general mathematical model for the production engineering (ProMAT)

Illés Dudás

University of Miskolc, Production Engineering, Miskolc, Hungary

WEDNESDAY, JUNE 27, 2018

HPC 18

09:30

121

In-process tool wear prediction system based on machine learning techniques and force analysis.

Amine Gouarir, Svetan Ratchev, Giovanna Martínez-Arellano,

German Terrazas, Panorios Benardos

Institute for Advanced Manufacturing, The University of Nottingham, Advanced Manufacturing, Nottingham, United Kingdom

09:50

122

Machining and machinability of tool steels: effects of lubrication and machining conditions on tool wear and tool life data

Victor Songmene

Ecole de technologie supérieure, ETS, Department of Mechanical Engineering, Montreal, Canada

10:10 – 10:30

Coffee break

10:30 – 11:50 MEASUREMENT & SENSORS 3

Plenary Room

Chair: Akos Miklos, Filippas Tzanetos

10:30

123

Implementation of jack bolts with built-in preload sensors for level condition monitoring of machine tool

Kotaro Mori¹, Daisuke Kono¹, Atsushi Matsubara¹, Hidenori Saraie²

¹Kyoto University, Department of Micro Engineering, Kyoto, Japan

²DMG MORI CO., LTD., Machinery Facility Planning & Management, Iga, Japan

10:50

124

Fabrication of a fiber probe using a CO2 laser for microstructure measurement: High functionality and durability test

Kosuke Uchiyama¹, Hiroshi Murakami¹, Akio Katsuki²,

Takao Sajima², Takahiko Yamamoto³, Ryosuke Nagata³,

Kunitaka Fujiyoshi⁴

¹The University of Kitakyushu, Department of Mechanical Systems Engineering, Faculty of Environmental Engineering, Kitakyushu, Japan

²Kyushu University, Department of Mechanical Engineering, Faculty of Engineering, Fukuoka, Japan

³Inatsuki Science Co., Ltd, Fukuoka, Japan

⁴Fukuoka Industrial Technology Center, Fukuoka, Japan

11:10

125

Metrological analysis of a mechatronic system based on novel deformation sensors for thermal issues in machine tools

Christian Brecher, Filippas Tzanetos, Michel Klatte, Tae Hun Lee

Fraunhofer IPT, Production Machines, Aachen, Germany



11:30

126

Measurement and analysis of thermo-elastic deviation of five-axis machine tool using dynamic R-testChristian Brecher¹, Jan Behrens², Tae Hun Lee², Filippos Tzanetos²¹WZL, RWTH Aachen University, Production Machines, Aachen, Germany²Fraunhofer Institute for Production Technology IPT, Production Machines, Aachen, Germany**10:30 – 11:30 ABRASIVE 6**

Room II.

Chair: Lars Langenhorst, Zheng LI

10:30

127

Grinding performance of TiCp/Ti-6Al-4V composites with CBN wheels, part I: experimental investigation and surface features

Zheng LI

Nanjing University of Aeronautics and Astronautics, College of Mechanical and Electrical Engineering, Nanjing, China

10:50

128

Grinding performance of TiCp/Ti-6Al-4V composites with CBN wheels, part II: material removal behavior based on FEM

Wenfeng Ding

Nanjing University of Aeronautics and Astronautics, College of Mechanical and Electrical Engineering, Nanjing, China

11:10

129

Analysis of internal material loads and resulting modifications for grinding with mechanical main impactLars Langenhorst¹, Florian Borchers¹, Carsten Heinzel²¹Leibniz Institute for Materials Engineering IWT, Manufacturing Technology, Bremen, Germany²Leibniz Institute for Materials Engineering IWT, University of Bremen, MAPEX Center for Materials and Processes, Manufacturing Technology, Bremen, Germany**10:30 – 11:50 CUTTING TOOLS 2**

Room III.

Chair: Zoltan Dombovari, Daniel Bachrathy

10:30

130

Study of flank wear topography and surface-deformation of cemented carbide tools after turning Alloy 718

Philipp Hoier, Amir Malakizadi, Peter Krajnik, Uta Klement

Chalmers University of Technology, Department of Industrial and Materials Science, Gothenburg, Sweden

10:50

131

Increased tool performance with niobium carbide based cutting materials in dry cylindrical turningEckart Uhlmann¹, Daniel Hinzmann¹, Kristin Kropidlowski¹,Paul Meier¹, Lukas Prasol¹, Mathias Woydt²¹Institute for Machine Tools and Factory Management - TU Berlin, Machine Tools and Manufacturing Technology, Berlin, Germany²Federal Institute for Materials Research and Testing (BAM), Materials Protection and Surface Technologies, Berlin, Germany

11:10

132

Influence of thickness of multilayer composite nano-structured coating Ti-TiN-(Ti,Al,Cr)N on tool life of metal-cutting toolAlexey Vereschaka¹, Sergey Grigoriev², Nikolay Sitnikov³,Gaik Oganyan⁴, Catherine Sotova⁵¹MSTU STANKIN, Manufacturing Technology, Moscow, Russia²MSTU STANKIN, High Performance Cutting, Moscow, Russia³Federal State Unitary Enterprise "Keldysh Research Center", None, Moscow, Russia⁴MSTU STANKIN, Machining Technology, Moscow, Russia⁵MSTU STANKIN, Materials and Technology, Moscow, Russia

11:30

133

Effect produced by thickness of nanolayers of multilayer composite wear-resistant coating on tool life of metal-cutting tool in turning of steel AISI 321Alexey Vereschaka¹, Nikolay Sitnikov², Jury Bublikov³,Sergey Grigoriev⁴, Andre Batako⁵¹MSTU STANKIN, Manufacturing Engineering, Moscow, Russia²Keldysh Research Center, Department of Solid State Physics and Nanosystems, Moscow, Russia³IKTI RAN, None, Moscow, Russia⁴MSTU STANKIN, High Performance Cutting, Moscow, Russia⁵Liverpool John Moores University, GERI, Liverpool, United Kingdom**10:30 – 11:50 MACHINES 1**

Room IV.

Chair: Christian Oppermann, Daniel Spescha

10:30

134

Enhancement and analysis of multidimensional characteristic diagrams for the machine control integrated correction of thermally caused TCP-displacements.Matthias Putz¹, Christian Oppermann², Michael Bräunig³¹Fraunhofer IWU, Head of Institute, Chemnitz, Germany²Fraunhofer IWU, Cutting Technology, Chemnitz, Germany³Chemnitz University of Technology, Machine Tools, Chemnitz, Germany



- 10:50 **135**
Influence of contact condition between flexible plate and passive pivot support on machining vibration
Atsushi Matsubara¹, Hiroaki Nagai¹, Nils Knorr², Daisuke Kono¹
¹Kyoto University, Department of Micro Engineering, Kyoto, Japan
²ETH Zürich, IWF, Department of Mechanical and Process Engineering, Zürich, Switzerland
- 11:10 **136**
Design to specifications – a strategy for specification-based machine design
Daniel Spescha¹, Sascha Weikert¹, Konrad Wegener²
¹Inspire AG ETH Zürich, Research and Technology Center, Zürich, Switzerland
²ETH Zürich, IWF, Institute of Machine Tools and Manufacturing, Zürich, Switzerland
- 11:30 **137**
Cartesian stiffness optimization for serial arm robots
Huseyin Celikag¹, Neil Sims¹, Erdem Ozturk²
¹University of Sheffield, Mechanical Engineering, Sheffield, United Kingdom
²University of Sheffield, AMRC, Sheffield, United Kingdom

11:50-13:30 Lunch

13:30 – 14:00 KEYNOTE LECTURE Plenary Room
Challenges in exploring stability islands for HPC
Gabor Stepan
Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary

14:10 – 15:30 CAD / CAM FOR HPC Plenary Room
Chair: Piotr Nieslony, Petr Vavruška

14:10 **138**
FEM-based optimization of machining operations of aerospace parts made of Inconel 718 superalloy
Piotr Nieslony
Opole University of Technology, Department of Mechanical Engineering, Opole, Poland

14:30 **139**
Cutting force and finish surface simulation of end-milling operation in consideration of static tool deflection by using voxel model
Isamu Nishida, Ryuma Okumura, Ryuta Sato, Keiichi Shirase
Kobe University, Graduate School of Engineering, Kobe, Japan

14:50 **140**
Reducing machining time by pre-process control of spindle speed and feed-rate in milling strategies
Petr Vavruška, Pavel Zeman, Michal Stejskal
Czech Technical University in Prague, Faculty of Mechanical Engineering, Department of Production Machines and Equipment, Prague, Czech Republic

15:10 **141**
Sculptured surfaces subdivision from 3d cloud of points and association of optimum ball cutters
Mohamed Bey¹, Krime Azouaoui²
¹Centre de Développement des Technologies Avancées - CDTA -, Division Productique et Robotique – DPR, Algiers, Algeria
²USTHB University, Mechanical Engineering Department, Algiers, Algeria

14:10 – 15:10 NON-CONVENTIONAL MACHINING 2 Room II.
Chair: Mikhail Kliuev, Andreas Klink

14:10 **142**
Technological and economical assessment of alternative process chains for turbocharger impeller manufacture
Andreas Klink¹, Markus Hlavac², Tim Herrig¹, Max Holsten¹
¹WZL, RWTH Aachen University, Chair of Manufacturing Technology, Aachen, Germany
²Robert Bosch GmbH, Production Technologies for Metals, Renningen, Germany

14:30 **143**
Flushing velocity observations and analysis during EDM drilling
Mikhail Kliuev¹, Christoph Baumgart¹, Henning Büttner², Konrad Wegener¹
¹ETH Zürich, IWF, Department of Mechanical Engineering, Zürich, Switzerland
²Inspire AG ETH Zürich, Department of Mechanical Engineering, Zürich, Switzerland

14:50 **144**
Model-based productivity analysis of Wire EDM for the manufacturing of titanium
Fritz Klocke, Lukas Welschhof, Tim Herrig, Andreas Klink
WZL, RWTH Aachen University, Manufacturing Technology, Aachen, Germany

14:10 – 15:30 CUTTING TOOLS 3 Room III.
Chair: Fredrik Schultheiss, Tamas Insperger

14:10 **145**
Specific carbide substrate design to enhance the tool performance in machining of Ti5553
M. Ibrahim Sadik, Martina Lattemann, José Garcia
R&D Sandvik Coromant, Cutting Technology, Stockholm, Sweden



WEDNESDAY, JUNE 27, 2018

14:30 **146**
Increased performance in high speed turning of Inconel 718 by laser structuring of PcBN tools

Berend Denkena, Thilo Grove, Alexander Krödel, Lars Ellersiek
Leibniz Universität Hannover, Institute of Production Engineering and Machine Tools, Hanover, Germany

14:50 **147**
Tool wear mechanisms of pcBN tooling during high-speed machining of gray cast iron

Fredrik Schultheiss¹, Volodymyr Bushlya¹, Filip Lenrick¹, Daniel Johansson¹, Stefan Kristiansson², Jan-Eric Ståhl¹
¹Lund University, Division of Production and Materials Engineering, Lund, Sweden
²Automotive Components Floby AB, Floby, Sweden

15:10 **148**
Optimizing cutting parameters for cutting power and roughness in VAT 32® turning with an experimental Al₂O₃-MgO ceramic tool using Taguchi's method.
Marcel Yuzo Kondo, Marcos Valério Ribeiro, José Vitor Candido Souza, Cleverson Pinheiro, Manoel Cléber de Sampaio Alves
Sao Paulo State University, Materials and Technology, Guaratinguetá, Brazil

14:10 – 15:10 MACHINES 2

Chair: Sinan Kesriklioglu, Mathieu Ritou

Room IV.

14:10 **149**
Dynamic modeling of machine tool spindle bearing system and model based diagnosis of bearing fault caused by collision

Songtao Xi¹, Hongrui Cao¹, Xuefeng Chen², Linkai Niu¹
¹Xi'an Jiaotong University, Department of Mechanical Engineering, Xi'an, China
²Xi'an Jiaotong University, State Key Laboratory for Manufacturing Systems Engineering, Xi'an, China

14:30 **150**
Real-time temperature measurement with embedded thin-film thermocouples in milling

Sinan Kesriklioglu, Frank E. Pfefferkorn
University of Wisconsin-Madison, Department of Mechanical Engineering, Madison, USA

WEDNESDAY, JUNE 27, 2018

HPC¹⁸

14:50 **151**
Influence of bearing kinematics hypotheses on ball bearing heat generation

Clement Rabreau¹, Josef Kekula², Mathieu Ritou¹, Matej Sulitka², Jongyoun Shim³, Sébastien Le Loch¹, Benoit Furet¹
¹University of Nantes, LS2N, Nantes, France
²Czech Technical University in Prague, RCMT, Prague, Czech Republic
³KIMM (Korea Institute of Machinery & Materials), Daejeon, South Korea

15:30 – 15:50 Coffee break

15:50 – 17:10 CUTTING TOOLS 4

Plenary Room

Chair: Chakradhar Bandapalli, Damir Grguraš

15:50 **152**
Tool wear analysis of micro end mills - uncoated and pvd coated tialn & AlTiN in high speed micro milling of titanium alloy - Ti-0.3Mo-0.8Ni .

Chakradhar Bandapalli¹, Yuvaraj Chinnappa², Kundankumar Singh³
¹Madanapalle Institute of Technology, Mechanical Engineering, Madanapalle, India
²Madanapalle Institute of Technology, Mechanical Engineering Department, Madanapalle, India
³Indian Institute of Technology Mumbai, Mechanical Engineering Department, Mumbai, India

16:10 **153**
Suitability of the full body ceramic end milling tools for high speed machining of nickel based alloy Inconel 718

Damir Grguraš, Matjaž Kern, Franci Pušavec
University of Ljubljana, Faculty of Mechanical Engineering, Department for Management of Manufacturing Technologies, Ljubljana, Slovenia

16:30 **154**
Study of the performance of PCBN and carbide tools in finishing machining of Inconel 718 with cutting fluid at conventional pressures

Víctor Criado del Álamo
Universidad Carlos III de Madrid, Bioengineering and Aerospace Engineering, Madrid, Spain

16:50 **155**
Tool performance assessment based on three-dimensional tool wear rate

Fernando Luiz Castro¹, Denis Boing², Rolf Bertrand Schroeter¹
¹Federal University of Santa Catarina, Department of Mechanical Engineering, Florianópolis, Brazil
²University Center of Brusque, Department of Mechanical Engineering, Brusque, Brazil

**15:50 – 16:50 NON-CONVENTIONAL MACHINING 3**

Room II.

Chair: Lisa Alhadeff, Andreas Klink

15:50

156**The application of wire electrical discharge machining (WEDM) in the prototyping of miniature brass gears**Lisa Alhadeff¹, David Curtis², Matthew Marshall¹, Tom Slatter¹¹University of Sheffield, Department of Mechanical Engineering, Sheffield, United Kingdom²University of Sheffield, Advanced Manufacturing Research Centre, Sheffield, United Kingdom

16:10

157**Limits of die-sinking EDM for micro structuring in W300 steel with pure copper electrodes**Henning Büttner¹, Raoul Roth²¹ETH Zürich, IWF, Department of Mechanical Engineering, Zürich, Switzerland²RhySearch, the Research and Innovation Centre Rheintal, RhySearch, Buchs, Switzerland

16:30

158**Investigation on wire-EDM finishing of titanium nitride doped silicon nitride in CH-based dielectrics**Fritz Klocke¹, Marcel Olivier¹, Ulrich Degenhardt², Tim Herrig¹,Ugur Tombul¹, Andreas Klink¹¹Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen University, Manufacturing Technology, Aachen, Germany²FCT Ingenieurkeramik GmbH, Frankenblick, Germany**15:50 – 16:50 MICRO MACHINING**

Room III.

Chair: Yves Kuche, Daniel Bachrathy

15:50

159**Fabrication of a ball nose end micro milling tool by tangential laser ablation**Melik Hajri¹, Josquin Pfaff², Henning Büttner¹, Rolf Kaufmann³,Konrad Wegener²¹Inspire AG ETH Zürich, Institute of Machine Tools and Manufacturing, Zürich, Switzerland²ETH Zürich, IWF, Institute of Machine Tools and Manufacturing, Zürich, Switzerland³Empa, Center for X-ray Analytics, Dübendorf, Switzerland

16:10

160**Influence of cutting edge radius on small scale material removal at ultra-precise level**

Muhommad Azizur Rahman

National University of Singapore, Department of Mechanical Engineering, SGP, Singapore

16:30

161**Influence of cutting edge micro-geometry in micro-milling of copper alloys with reduced lead content**Eckart Uhlmann¹, Yves Kuche¹, Julian Polte², Mitchel Polte¹¹Institute for Machine Tools and Factory Management - TU Berlin, Chair of Machine Tools and Manufacturing Technology, Berlin, Germany²Fraunhofer Institute for Production Systems and Design Technology, Production Systems, Berlin, Germany**15:50 – 16:50 MACHINES 3**

Room IV.

Chair: Knut Sorby, Akos Miklos

15:50

162**Precision turning with instrumented vibration-damped boring bars**Knut Sorby¹, Dan Østling²¹NTNU Norwegian University of Science and Technology, Department of Mechanical and Industrial Engineering, Trondheim, Norway²Sandvik Coromant, Trondheim, Norway

16:10

163**Dynamic substructuring of machine tools considering local damping models**

Thomas Semm, Maximilian Spannagl, Michael F. Zaeh

Institute for Machine Tools and Industrial Management (iwb), TU Munich, Department of Mechanical Engineering, Munich, Germany

16:30

164**Hardware-in-the-loop experiment of turning and interrupted milling**Akos Miklos¹, Daniel Bachrathy¹, Richard Wohlfart¹, Denes Takacs¹, Gabor Porempovics¹, Andras Toth², Gabor Stepan¹¹Budapest University of Technology and Economics, Department of Applied Mechanics, Budapest, Hungary²Budapest University of Technology and Economics, Department of Manufacturing Science and Engineering, Budapest, Hungary**17:10 – 17:30 CLOSING CEREMONY**

Plenary Room



Authors' Index

NAME	PAGE
Eberhard ABELE	26
Ramy ABDALLAH	29
Kunal AHLUWALIA	44
Norshah AIZAT SHUAIB	29
Aiman AKMAL ABDUL NASIR	29
Lisa ALHADEFF	52
Seyed ALI NIKNAM	23
Yusuf ALTINTAS	21
Loun s AMRAN ILLOUL	41
Rabiae ARIF	41
Kubilay ASLANTAS	23
Viktor ASTAKHOV	37
Muhammad ASYRAF MAHBOOB ALI... 31, 41	
François AUZENATB	37
Muhammad AZIZUR RAHMAN	52
Krimo AZOUAOUI	49
Wei BA	28
Daniel BACHRATHY	24, 27, 28, 37, 53
Dirk BÄHRE	32, 36
Wei BAI	28
Julien BAJOLET	38
Zsuzsa BALAJTI	33
Marek BALAZINSKI	23, 40
Chakradhar BANDAPALLI	51
Ankit BANSAL	28
Rosa BASAGOITI	34
Andre BATAKO	47
Christoph BAUMGART	22, 49
Steven BECKER	30
Sverker BEHAGEN	41
Jan BEHRENS	46
Panorios BENARDOS	45
Szabolcs BEREZVAI	27
Bence BERI	28
Jan BERTHOLD	43
NAME	PAGE
Rachele BERTOLINI	35
Rolf BERTRAND SCHROETER	51
Mohamed BEY	33, 49
Dirk BIERMANN	24
Marvin BINDER	40
Nevzat BIRCAN BUGDAYCI	25
István BIRÓ	33, 38
Anuj BISHT	28
Giuliano BISSACCO	31
Patrick BLANDENET	41
Denis BOING	51
Florian BORCHERS	46
Dmytro BORYSENKO	22
Michael BRÄUNIG	47
Christian BRECHER	45, 46
Ekkard BRINKSMEIER	33
Matt BRODERICK	41
Alexander BROSIUS	44
Stefania BRUSCHI	35
Jury BUBLIKOV	47
Erhan BUDAK	32, 34
Volodymyr BUSHLYA	41, 50
Henning BÜTTNER	49, 52
Gerald BYRNE	21
Jan C. AURICH	30
Angela CAMPA	24
Hongrui CAO	21, 50
Chang CAO	25
Zhong-Chen CAO	38
Anna CARLA ARAUJO	30
Patrice CARRAS	41
Stefan CEDERGREN	43
Huseyin CELIKAG	48
Jean-François CHATELAIN	35, 40
Alessandro CHECCHI	31
Xuefeng CHEN	21, 50
Ding CHEN	33
Wenyu CHENG	37
Iheb CHERIF	37

NAME	PAGE	NAME	PAGE
Yuvaraj CHINNAPPA	51	Peter EBERHARD	24
Tan CHYE LIH	29	Robert ECKARDT	40
Adem CICEK	23	Rocco EISSELER	21
Maria CINDRA FONSECA	30	Lars ELLERSIEK	50
Christophe CLAUDIN	38	Mehmet EMRE KARA	32
Manoel CLÉBER DE SAMPAIO ALVES	50	Toshiyuki ENOMOTO	32
Ryan COPENHAVER	24	Sarah ESCHELBACHER	39
Jean-Philippe COSTES	37	Mahdi EYNIAN	43
Pierre COULON	35	Michael F. ZAEH	53
Víctor CRIADO DEL ÁLAMO	51	Jiří FALTA	28
Nan CUI	37	Pierre FAVERJON	36
Chloe CUNNINGHAM	29	Csaba FELHŐ	36
David CURTIS	31, 52	Guillaume FROMENTIN	37, 41
Jürgen CZARSKE	22	Marion FRUECHT	21
Christoph CZETTL	26	Kunitaka FUJIYOSHI	45
Gleiton DE PAULA OLIVEIRA	30	Kaoru FUKUSHIMA	22
Florian DEGEN	33	Roman FUNKE	32
Ulrich DEGENHARDT	52	Benoit FURET	51
Lamice DENGUIR	37, 40	Tamas G. MOLNAR	28
Berend DENKENA	50	Hans N GAARD HANSEN	31
Krupansh DESAI	35	Varsharani GAIKHE	29, 43
István DESZPOTH	22	Yogesh GAIKHE	29
Vimal DHOKIA	29	Yifan GAO	27
Eugenio DI IORIO	35	José GARCIA	49
José DÍAZ-ÁLVAREZ	26	Norbert GEIER	33, 38
Ye DING	25	Hassan GHADBEIGI	31
Han DING	25, 30, 42	Behnam GHALAMCHI	29
Feng DING	40	Andrea GHIOTTI	35
Wenfeng DING	46	Samantha GIOVANA ABREGO HERNANDEZ	41
Benjamin DOEBBELER	40	Leif GOLDBAHN	40
Zoltan DOMBOVARI	25	Amine GOUARIR	45
Théo DORLIN	37, 41	Manuel GREULICH	36
Benjamin DÖBBELER	23	Damir GRGURAŠ	51
Timo DÖRGELOH	33	Sergey GRIGORIEV	47
Konstantin DREWLE	21	Daniel GROSS	30
Martine DUBÉ	35	Frank GROSSENBACHER	39
Illés DUDÁS	44	Thilo GROVE	50
Marie-Salome DUVAL-CHANEAC	38	Karl GRÖZINGER	21
Frank E. PFEFFERKORN	50	Liyao GU	37

NAME	PAGE	NAME	PAGE
Oleksandr GUTNICHENKO	41	Shunya KAIBU	32
Ruediger HAAS	24	Kazuki KANEKO	21
Bernhard HAHN	32	Habib KARAOUNI	37
David HAJDU	24	Nikolaos KARKALOS	29
Melik HAJRI	52	Bernhard KARPUSCHEWSKI	22
Sangil HAN	36, 38	Akio KATSUKI	45
Albrecht HÄNEL	44	Rolf KAUFMANN	52
Nico HANENKAMP	30	Josef KEKULA	51
Mohsen HASSANZADEH OTAGHVAR	32	Matjaž KERN	51
Manuel HASTEROK	44	Kevin KERRIGAN	35
Yong HE	27	Sinan KESRIKLIOGLU	50
Carsten HEINZEL	46	Navneet KHANNA	35
Viktor HEIZER	22	Martin KIMMELMANN	39
Maria HENAR MIGUÉLEZ	26	Benjamin KIRSCH	30
Tim HERRIG	49, 52	Michel KLATTE	45
Daniel HINZMANN	47	Sven KLEIN	36
Markus HLAVAC	49	Uta KLEMENT	46
Philipp HOIER	46	Andreas KLINK	49, 52
Max HOLSTEN	49	Mikhail KLIUEV	49
Richard HOOD	29	Fritz KLOCKE	23, 40, 49, 52
Jeong HOON KO	27, 42	Nils KNORR	48
Marcel HORÁK	26	Martin KOLOUCH	42, 43
Hendrik HOTZ	30	Atsuyuki KONDO	25
Tao HUANG	42	Daisuke KONO	22, 45, 48
Tae HUN LEE	45, 46	Jules KOUAM	23
Alexandre IL	40	Peter KRAJNÍK	46
Diego INFANTE-GARCIA	26	Gabor KRAJNYAK	43
Tamas INSPERGER	24, 28, 42	Stefan KRISTIANSSON	50
Azwan ISKANDAR AZMI	29, 31, 41	Edwin KROKE	44
Ariane ITURBE	24	Kristin KROPIDLOWSKI	47
Hamid JAMSHIDI	34	Alexander KRÖDEL	50
Miroslav JANOTA	28	Yves KUCHE	53
Tormod JENSEN	31	Michal KUFFA	44
Yifei JIANG	27	János KUNDRÁK	22, 29, 36
Xiang-Min JIANG	38	Robert KUSCHMIERZ	22
Daniel JOHANSSON	50	Rachel KUSKE	25
Pedro JOSE ARRAZOLA	24, 34	Friedrich KUSTER	25, 38, 39
Lee JOSEPH	34	Thomas LAKNER	23
Adam K KISS	37	Jean-Francois LALONDE	40

NAME	PAGE	NAME	PAGE
Lars LANGENHORST	46	Hans-Christian MOEHRING	21, 39
Natanael LANZ	44	Jérémie MONNIN	25
Martina LATTEMANN	49	Florian MORCZINEK	38
Mohit LAW	28	Kotaro MORI	22, 45
Xabier LAZKANO	34	Mojtaba MUBARAKI	29
Sébastien LE LOCH	51	Terje MUGAAS	31
Filip LENRICK	50	Jokin MUNOA	25, 31
Sein LEUNG SOO	29	Ana MU OZ-SÁNCHEZ	26
Min LI	27	Hiroshi MURAKAMI	45
Yan LI	38	Ralf MÜLLER	30
Zheng LI	46	Ahmad NABIL MOHD KHALIL	31, 41
Bin LIN	34, 38	Hiroaki NAGAI	48
Hongguang LIU	27	Ryosuke NAGATA	45
Zhechao LIU	27	Muhammad NASIR MURAD	31
Pengfei LIU	34	Andreas NESTLER	44
Iñigo LLANOS	24	Guang-chao NIE	30
Philippe LORONG	41	Piotr NIESLONY	48
José LUIS CANTERO	26	Isamu NISHIDA	21, 48
Fernando LUIZ CASTRO	51	Jinbo NIU	25
Mikael LUNDBLAD	43	Linkai NIU	50
Ming LUO	26	František NOVOTNÝ	26
Gaetano M. PITTALA	41	Donka NOVOVIC	31
Rachid M'SAOUBI	24, 37	Gaik OGANYAN	47
Martin MAGNEVALL	43	Masato OKADA	25
Amir MALAKIZADI	46	Ryuma OKUMURA	48
Bertrand MARCON	37, 41	Marcel OLIVIER	52
Angelos MARKOPOULOS	29	Hesam OMIDITABRIZI	32
Matthew MARSHALL	41, 52	P. Y. ONAWUMI	39
Giovanna MARTÍNEZ-ARELLANO	45	Christian OPPERMANN	47
Atsushi MATSUBARA	22, 45, 48	Masaaki OTSU	25
Johannes MAYR	26	Andreas OTTO	42
Rijul MEDIRATTA	44	José OUTEIRO	37, 40
Paul MEIER	47	Jivka OVTCHAROVA	24
E. MERSON	39	Erdem OZTURK	42, 48
Ketav MIHIR MAJUMDAR	44	Dan ÖSTLING	31
Akos MIKLOS	43, 53	Ekrem ÖZKAYA	24
Nicolas MILLIKEN	36	Uygar PALA	38
Takuya MIURA	25	Jack PALMER	31
Takeru MIZUTANI	32	Jeet PATIL	29

NAME	PAGE	NAME	PAGE
Raju PAWADE	43	Hironori SASAI	35
Bingxiao PENG	23	Urara SATAKE	32
Jingfu PENG	25	Ryuta SATO	21, 48
Josquin PFAFF	52	Richard SCAIFE	35
Christina PIETSCHMANN	40	Jonathan SCHAEFER	26
Cleverson PINHEIRO	50	Christian SCHIMPF	44
Julian POLTE	53	Tony SCHMITZ	24
Mitchel POLTE	53	Dirk SCHNABEL	24
Gabor POREMPOVICS	53	Sebastian SCHNEIDER	23
Martin POSTEL	25	Andreas SCHUBERT	32
Christopher PRAETZAS	26	Fredrik SCHULTHEISS	50
Lukas PRASOL	47	Marcus SCHWARZ	44
Heow PUEH LEE	27	Lukas SEEHOLZER	39
Franci PUŠAVEC	51	Martin SEIMANN	40
Matthias PUTZ	43, 47	Andres SELA	34
Yutong QI	27	Thomas SEMM	53
Baijie QIAO	21	Arjun SHETH	35
Mohammad RABIEY	34	Jongyoun SHIM	51
Clement RABREAU	51	Keiichi SHIRASE	21, 48
Günter RADONS	42	Alborz SHOKRANI	29, 30
Kaveh RAHIMZADEH BERENJI	32	Neil SIMS	42, 48
Juho RATAVA	29	Kundankumar SINGH	51
Svetan RATCHEV	45	Nikolay SITNIKOV	47
Ahmad RAZLAN YUSOFF	39	Tom SLATTER	52
Joël RECH	36, 38	Gregor SMYCZEK	33
O. REMUS TUTUNEA-FATAN	36	Victor SONGMENE	23, 27, 45
Oltmann RIEMER	33	Jussi SOPANEN	29
Xavier RIMPAULT	35, 40	Knut SØRBY	23, 53
Mathieu RITOU	51	Marco SORTINO	42
Frédéric ROSSI	41	Catherine SOTOVA	47
Raoul ROTH	52	Maximilian SPANNAGL	53
Grigory ROTSHTEYN	33	Daniel SPESCHA	44, 48
Anish ROY	28, 39	Jan-Eric STÅHL	41, 50
M. Ibrahim SADIK	49	Oddvar STANDAL	31
Jambeswar SAHU	43	Marie STARÁ	26
Takao SAJIMA	45	Michal STARÝ	26
Mehdi SALEHI	24	Michal STEJSKAL	49
Ferdinando SALVATORE	38	Gabor STEPAN	24, 25, 27, 28, 37, 42, 43, 48, 53
Hidenori SARAIE	45	Luka STERLE	40

NAME	PAGE	NAME	PAGE
Dan STLING	53	Konrad WEGENER	22, 25, 37, 38, 39, 44, 48, 49, 52
Takumi SUETOMI	26	Sascha WEIKERT	48
Matěj SULITKA	28, 51	Lukas WELSCHOF	49
Ronglei SUN	28	Harald WERNER	32
Satyam SUWAS	28	Volker WITTSTOCK	43
Reiji SUZUKI	25	Richard WOHLFART	43, 53
Stefan SÜSSMAIER	38	Mathias WOYDT	47
Tibor SZALAY	33, 38	Anders WRETLAND	43
Henrik T SYKORA	24	Christian WROBEL	34
Denes TAKACS	43, 53	Patxi XABIER ARISTIMU O	34
Hidetake TANAKA	22, 35	Songtao XI	50
Chris TAYLOR	41	Weiqiang XIONG	39
Tamara TEPPERNEGGE	26	Xiang XU	27
German TERRAZAS	45	Joselito YAM ALCARAZ	44
Mathias TJOMSLAND	31	Takahiko YAMAMOTO	45
Ugur TOMBUL	52	Jianzhang YANG	39
Andras TOTH	43, 53	S.H. YEO	44
Giovanni TOTIS	42	Yaohui YUAN	39
Filippos TZANETOS	45, 46	Marcel YUZO KONDO	50
Kosuke UCHIYAMA	45	Oier ZELAIETA	24
Eckart UHLMANN	47, 53	Pavel ZEMAN	49
Takuma UMEZU	22	Xingwu ZHANG	21
Luis UREÑA	42	Hao ZHANG	22
Evgueni V. BORDATCHEV	36	Xiaoming ZHANG	25, 30, 42
Vadim V. SILBERSCHMIDT	28, 39	Xiaodong ZHANG	26
Zydrunas VAGNORIUS	23	Dinghua ZHANG	26
Marcos VALÉRIO RIBEIRO	50	Jun ZHANG	27
Frédéric VALIORGUE	36	Dong ZHANG	30
Gyula VARGA	22	Tao ZHANG	40
Juha VARIS	29	Wanhua ZHAO	27
Petr VAVRUSKA	49	Lijuan ZHENG	39, 40
Alexey VERESCHAKA	47	LiMin ZHU	25
José VITOR CANDIDO SOUZA	50	Xuguang ZHU	40
Amey VIVEK MANKAR	44		
Erik VON HARBOU	30		
Robert VOSS	39		
Chenxi WANG	21		
Chengyong WANG	39, 40		
Hidehito WATANABE	25		



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