The CIRP sponsored conference highlights research on thermal issues in machine tools, forming machines, industrial 3D printers and hybrid machines. It will take place on March 21-23, 2023 in Dresden, Germany.

We are already very much looking forward to your visit!

The program is highlighted by lab demonstrations of 12 years intense research by the CRC/TR 96 community (funded by the DFG) from Dresden, Aachen and Chemnitz.
GENERAL INFORMATION

ORGANIZED BY:
- Chair of Machine Tools Development and Adaptive Controls of TU Dresden
- CRC/TR 96: Thermo-energetic design of machine tools
- Sponsored by CIRP International Academy for Production Engineering

ORGANISATION COMMITTEE
Prof. Steffen Ihlenfeldt (chairman)
Prof. Christian Brecher
Prof. W.-G. Drossel
Dr. Lars Penter

ADDITIONAL INFORMATION
Website: https://ictimt2023.de
E-Mail: contact@ictimt2023.de
Conference Language: English

Conference Location:
Messe Dresden, Germany
Messering 6
01067 Dresden

See the location of the venues on Google maps.
https://goo.gl/maps/bzY3fsEBkNfMY65C7

REGISTRATION
Please register via the conference website: https://ictimt2023.de/registration

Registration fee: 700 EUR plus VAT
GENERAL INFORMATION

ACCOMMODATION

The participants are kindly asked to book their accommodation by themself. We recommend the Penck Hotel (https://www.penckhoteldresden.de/). There we have reserved a room contingent.

Please register with the email or phone number at the hotel and use the keyword "ICTIMT" to access the contingent.

Telephone: +49 351 4922-785
Email: reservierung@penckhotel.de

The single room costs 90 EUR per night, the double room costs 114 EUR per night.

The cost of accommodation is not included in the registration fee and must be paid by each participant themself.

[Pic: Holidaycheck; penckhoteldresden.de]
SCIENTIFIC COMMITTEE

Prof. T. Bergs
RWTH Aachen University | Laboratory for Machine Tools and Production Engineering

Prof. C. Brecher
RWTH Aachen University | Laboratory for Machine Tools and Production Engineering

Prof. E. Budak
Sabanci University | Faculty of Engineering and Natural Sciences

Prof. B. Denkena
Leibniz Universität Hannover | Institute of Production Engineering and Machine Tools

Prof. M. Dix
Fraunhofer Institute for Machine Tools and Forming Technology IWU

Dr. O. Horejš
Czech Technical University in Prague | Research Center of Manufacturing Technology

Dr. P. Kolar
Czech Technical University in Prague | Research Center of Manufacturing Technology

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Prof. H.-C. Möhring
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Dr. L. Penter
TU Dresden | Chair of Machine Tools Development and Adaptive Controls

Dr. M. Ritou
Université de Nantes | Laboratoire des Sciences du Numérique de Nantes

Dr. M. Sulitka
Czech Technical University in Prague | Research Center of Manufacturing Technology

Prof. R. Wertheim
Braude College, Israel | Faculty of Mechanical Engineering
## PROGRAM: OVERVIEW (SUBJECT TO CHANGES)

20\textsuperscript{th} March 2023, 7:00 pm: Welcome Reception and Get Together

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<td>14:00 Demonstration of Technical Solutions to thermal Issues in Machine Tools</td>
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OPENING SESSION
09:00 am - 09:15 am
Welcome Address
Steffen Ihlenfeldt
TU Dresden, Germany

09:15 am - 9:30 am
Greetings
Prof. Dr. Angela Rösen-Wolff, Vice-Rector Research
TU Dresden, Germany

09:30 am -10:15 am
Keynote I
Christian Brecher
RWTH Aachen University, Germany

10:45 am - 11:30 am
Keynote II
Konrad Wegener
ETH Zürich, Switzerland

11:30 am – 12:15 noon
Keynote III
Steffen Ihlenfeldt
TU Dresden, Germany

TRANSFER TO LABORATORY KUTZBACH-BAU,
TU DRESDEN
2:30 pm - 6:30 pm

**Technical solutions to thermal issues in machine tools**

Researcher of CRC/TR 96
TU Dresden, Chemnitz University of Technology, RWTH Aachen University

Live Demonstrations:

- Demonstrations of real-time correction solutions for thermally induced TCP displacements on various machine tools
- Integrated measurement of structural component deformations and correction of resulting TCP displacements via an online correction model
- Demonstrations of real-time correction of thermally induced TCP displacements on a lightweight experimental milling machine test rig using various digital twins with different modelling approaches.
- Measuring thermally induced TCP displacements on milling machines using a test work piece
SESSION A1: THERMAL ERROR COMPENSATION AND CORRECTION I

08:30 am - 09:00 am
Keynote: Thermal Error Compensation and Correction
Naruhiro Irino
DMG MORI CO., LTD., Japan

09:00 am - 09:30 am
Thermal compensation of sudden working space condition changes in swiss-type lathe machining
Petr Kaftan¹, Josef Mayr², Konrad Wegener¹
¹ETH Zürich, ²inspire AG, Switzerland

09:30 am - 10:00 am
Hybrid thermal error compensation combining integrated deformation sensor and regression analysis based models for complex machine tool designs
Christian Naumann¹, Andreas Naumann²,³, Nico Bertaggia⁴, Alexander Geist¹, Janine Glänzel¹, Roland Herzog²,³, Daniel Zontar⁴, Christian Brecher⁴,⁵, Martin Dix¹,²
¹Fraunhofer Institute for Machine Tools and Forming Technology IWU Chemnitz, ²Chemnitz University of Technology, ³Heidelberg University, ⁴Fraunhofer Institute for Production Technology IPT Aachen, ⁵RWTH Aachen University, Germany

SESSION A2: THERMAL ERROR COMPENSATION AND CORRECTION II

10:30 am - 11:00 am
Thermal Error Compensation Models utilizing the Power Consumption of Machine Tools
Sebastian Lang¹, Nico Zimmermann², Josef Mayr², Konrad Wegener¹, Markus Bambach¹
¹ETH Zürich, ²inspire AG, Switzerland
11:00 am - 11:30 am
Indicative model considering part of thermo-mechanical behaviour of large grinding machine
Martin Mareš¹, Otakar Horejš¹, Pravoslav Nykodym²
¹Czech Technical University in Prague, ²TOS Hostivař s.r.o., Czechia

11:30 am - noon
Adaptive thermal model for structure model based correction
Xaver Thiem, Holger Rudolph, Robert Krahn, Steffen Ihlenfeldt, Christof Fetzer, Jens Müller
TU Dresden, Germany

SESSION A3: PROCESS PARALLEL MODELS I

1:00 pm - 1:30 pm
Keynote

1:30 pm - 2:00 pm
A data-based model of the thermo-elastic TCP error using the encoder difference and neural networks
Christian Brecher, Mathias Carsten Dehn, Stephan Neus
RWTH Aachen University, Germany

2:00 pm - 2:30 pm
Model order reduction strategies for the computation of compact machine tool models
Quirin Aumann¹, Peter Benner², Jens Saak², Julia Vettermann¹
¹Chemnitz University of Technology, ²Max Planck Institute for Dynamics of Complex Technical Systems, Germany

SESSION A4: PROCESS PARALLEL MODELS II

3:00 pm - 3:30 pm
Simulation of thermoelastic behavior of technical systems with relatively moving parts - Modeling process, part coupling approaches and application to machine tools
Stefan Sauerzapf, Michael Beitelschmidt
TU Dresden, Germany
3:30 pm - 4:00 pm
**Thermal modal analysis for volumetric error characterization**
Natalia Colinas-Armijo\(^1\), Beñat Iñigo\(^1\), Luis Norberto López de Lacalle\(^2\), Gorka Aguirre\(^1\)
\(^1\)IDEKO, \(^2\)Universidad of the Basque Country (UPV/EHU), Spain

4:00 pm - 4:30 pm
**Development of a system for the evaluation and recommendation of solution methods for thermally induced errors on machine tools**
Carola GiOSke, Axel Fickert, Hajo Wiemer
*TU Dresden, Germany*

TRANSFER TO SCHLOSS ALBRECHTSBERG
SESSION B1: SENSOR INTEGRATION
8:30 am - 9:00 am
Keynote: Measuring equipment
Dr. Dontsov
SIOS GmbH, Germany

09:00 am - 09:30 am
Smart pressure film sensor for machine tool optimization and characterization of the dynamic pressure field on machine surfaces
Andreas Erben, Björn Senf, Alexander Geist, Janine Glänzel, Immanuel Voigt, Steffen Ihlenfeldt, Welf-Guntram Drossel
Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany

9:30 am - 10:00 am
Thermally induced clamping force deviations in a sensory chuck for thin-walled workpieces
Berend Denkena¹, Heinrich Klemme¹, Eike Wnendt¹, Matthias Meier ²
¹Leibniz University Hannover, ²HWR Spanntechnik GmbH, Germany

SESSION B2: COMPONENTS I – MAIN SPINDLES
10:30 am - 11:00 am
Improving the thermal behavior of high-speed spindles through the use of an active controlled heat pipe system
Lucas Jonath, Jörg Luderich, Jonas Brezina, Gonzalez Degetau Ana Maria, Selim Karaoglu
TH Köln, Germany

11:00 am - 11:30 am
Thermal growth of motor spindle units
Tassilo Heinze¹, Hans-Joachim Koriath¹, Alexander Pavlovich Kuznetsov
¹SPL Spindel und Praezisionslager GmbH, Germany, ²Moscow State University of Technology STANKIN, Russia

11:30 am - noon
Thermal modeling challenges of high-speed motorized spindles
Lukas Koch¹, Felix Butz³, Gordana Krüger¹, Frank Döpper²
¹Technical University of Applied Sciences Würzburg-Schweinfurt, ²University of Bayreuth, ³Weiss Spindeltechnologie GmbH Germany
SESSION B3: COMPONENTS II – DESIGN AND MATERIALS

1:00 pm - 1:30 pm

Keynote

1:30 pm - 2:00 pm

Experimental investigation of passive thermal error compensation approach for machine tools using latent heat storage and heat pipe systems
Immanuel Voigt¹; Axel Fickert², Hajo Wiemer², Welf-Guntram Drossel¹,³
¹Chernitz University of Technology, ²TU Dresden, ³Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany

2:00 pm - 2:30 pm

Determination of the thermal properties of pre-stressed fiber-reinforced polymer concrete
Michelle Engert, Kim Torben Werkle, Hans-Christian Möhring
Universität Stuttgart, Germany

SESSION B4: TOOLS AND PROCESSES

3:00 pm - 3:30 pm

Simulation of cBN grain wear during single grain engagement considering cleavage planes
Marc Bredthauer, Sebastian Barth, Pattrick Mattfeld, Thomas Bergs
RWTH Aachen University, Germany

3:30 pm - 4:00 pm

Development of a tool temperature simulation during 5-axis milling
Thorsten Helmig, Hui Liu, Simon Winter, Thomas Bergs, Reinhold Kneer
RWTH Aachen University, Germany

4:00 pm - 4:30 pm

Three-dimensional modeling of thermomechanical tool loads during milling using the coupled Eulerian-Lagrangian formulation
Hui Liu, Markus Meurer, Thomas Bergs
RWTH Aachen University, Germany
SESSION A5: MODEL VERIFICATION
8:30 am - 9:00 am
Keynote: Model Verification
Marcus Mixner
Schwäbische Werkzeugmaschinen GmbH, Germany

9:00 am - 9:30 am
Definition of a non-contact induction heating of a cutting tool as a substitute for the process heat for the verification of a thermal simulation model
Lukáš Topinka¹, Radomír Pruša², Rostislav Huzlík², Joachim Regel¹
¹Chemnitz University of Technology, Germany,
²Brno University of Technology, Czechia

9:30 am - 10:00 am
Measuring thermally induced TCP-displacements on milling machines using a test work piece
Axel Fickert, Hajo Wiemer, Carola Gißke, Lars Penter
TU Dresden, Germany

SESSION A6: THERMAL ERROR COMPENSATION AND CORRECTION III
10:30 am - 11:00 am
Adaptive thermal error compensation model of a horizontal machining centre
Otakar Horejš¹, Martin Mareš¹; Michal Straka¹, Jiří Švéda¹, Tomáš Kozlok²
¹Czech Technical University in Prague, ²TOS VARNSDORF a. s., Czechia

11:00 am - 11:30 am
Consideration of task dependent loads in thermal simulations of machine tool components
Eric Wenkler¹, Christoph Steiert¹, Eugen Boos¹, Steffen Ihlenfeldt¹,²
¹TU Dresden, ²Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany

11:30 am - noon
Keynote: Thermal Error Compensation and Correction
Markus Bambach, ETH Zürich, Switzerland
CONFERENCE SUPPORTING PROGRAM

WELCOME RECEPTION AND GET TOGETHER
20th March 2023, 7:00 pm
Penck-Hotel
Ostra-Allee 33, 01067 Dresden

JOINT DINNER
21st March 2023: 6:30 pm – 10:30 pm
Dülfersaal
Dülferstraße, 01062 Dresden

GALA DINNER
22nd March 2023: 6:30 pm – 10:30 pm
Schloss Albrechtsberg,
Bautzner Straße 130, 01099 Dresden

Transfer:
• 5:30 pm, from Messe
• 6:00 pm, from Penck-Hotel