FAU

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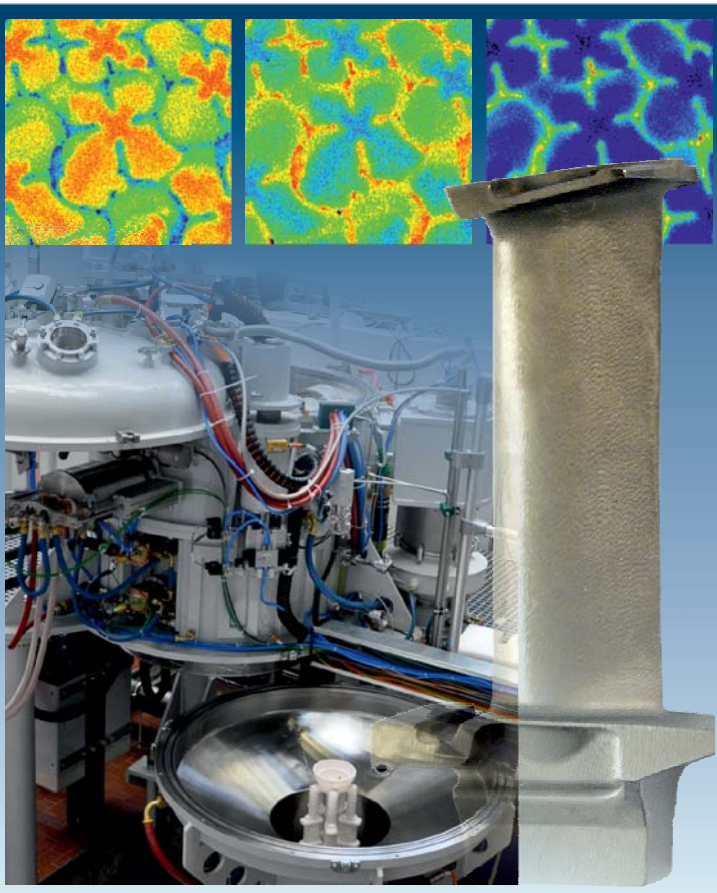
SFB/Transregio 103

SUPERALLOY SINGLE CRYSTALS

# From Atoms to Turbine Blades

**6 – 7 March 2018**

**Industrial Colloquium of the SFB/TR 103**



www.sfb-transregio103.de

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# PROGRAM

## From Atoms to Turbine Blades

### SCOPE

Superalloys represent key materials for turbine blades in modern gas turbines for aero engines and power plants. International mobility and global energy supply rely on this fascinating class of high temperature materials. Improvements in efficiency and emissions demand new concepts for alloy design and fabrication technology.

This colloquium focuses on recent progress in material and process development in the field of Ni- and Co-based superalloys taking into account future trends in developing, processing and applications of these extraordinary materials.

The collaborative research center SFB/TR 103 „From Atoms to Turbine Blades“ aims on gaining a scientific basis for future generations of superalloys. The colloquium will bring together researchers and industrial users to accomplish improvements in this field.

### TOPICS

- Superalloy development and optimization
- Casting process development
- Additive manufacturing of superalloys
- Refurbishment of turbine parts
- Modelling and simulation

## Tuesday, March 6th

**12:00 Registration and light refreshments**

**13:00 Welcome**

**13:05 Outline of the SFB/TR 103 „From atoms to turbine blades“**
**Eggeler, G.,** *Chair for Materials Science and Engineering, Ruhr-Universität Bochum, Bochum, Germany*

**13:30 Superalloys in the aerospace industry: from alloy 718 to single crystals**
**Roth-Fagaraseanu, D.,** *Rolls-Royce Deutschland, Berlin, Germany*

**14:00 Single crystal casting with fluidized farbon bed cooling: a process innovation for quality improvement and cost reduction**
**Singer, R. F.,** *Neue Materialien Fürth GmbH, Fürth, Germany*

**14:30 Additive manufacturing of single crystalline nickel-based superalloys**
**Körner, C.,** *Chair of Materials Science and Engineering for Metals, FAU Erlangen-Nürnberg, Erlangen, Germany*

**15:00 Coffee Break**

**15:30 Recent developments in the prediction of nickel-based superalloy properties using Thermo-Calc software**
**Rettig, R.,** *Thermo-Calc Software AB, Solna, Sweden*

**16:00 Development of a new family of blade alloys combining high corrosion and oxidation resistance**
**Hasselqvist, M.,** *Siemens Industrial Turbomachinery AB, Finspång, Sweden*

**16:30 New γ’-strengthened cobalt base superalloys**
**Göken, M. and Neumeier, S.,** *Chair of General Material Properties, FAU Erlangen-Nürnberg, Germany*

**17:00 Experimental strategies for mechanistic studies of high-temperature oxidation behavior of model systems and advanced alloys**
**Virtanen, S. and Weiser, M.,** *Chair for Surface Science and Corrosion, FAU Erlangen-Nürnberg, Erlangen, Germany*

**17:30 - 20:00 Get-together at NMF**

## Wednesday, March 7th

**9:00 Multi-scale simulation of Ni-base turbine blades: From solidification to rafting under creep conditions**
**Steinbach, I.,** *Interdisciplinary Centre for Advanced Materials Simulation (ICAMS), Ruhr-Universität Bochum, Bochum, Germany*

**9:30 Multiaxial creep testing of single crystal Ni-base superalloys**
**Eggeler, G. and Bürger, D.,** *Chair for Materials Science and Engineering, Ruhr-Universität Bochum, Bochum, Germany*

**10:00 The role of systematic characterization on the development of new nickel-based superalloys**
**Kontis, P.,** *Microstructure Physics and Alloy Design Department, Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany*

**10:30 Coffee Break**

**11:00 Effect of microstructural features and their size on low cycle fatigue of CMSX-4 nickel base superalloy at high temperature**
**Bartsch, M.,** *Institute of Materials Research, German Aerospace Center, Köln, Germany*

**11:30 New materials for hot section aero engine components**
**Stoll, I.,** *MTU Aero Engines GmbH, München, Germany*

**12:00 Lunch**

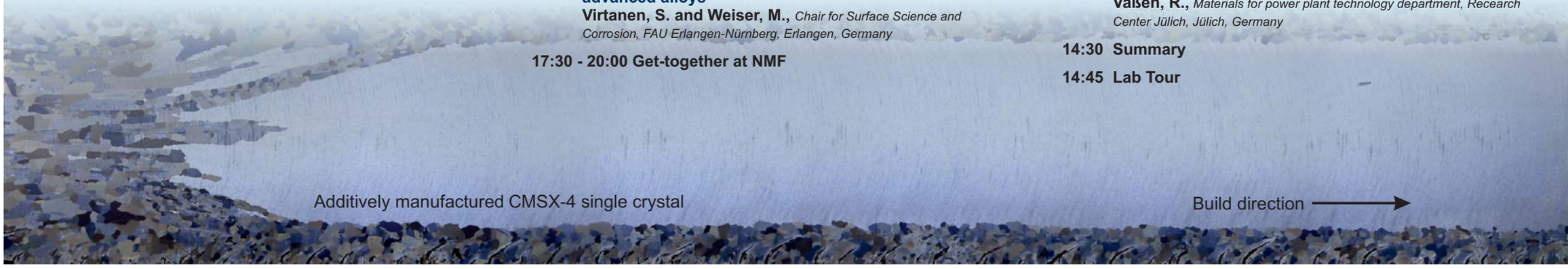
**13:00 Back to the initial state, restoring the microstructure and the mechanical properties of a SX Ni-base superalloy by HIP treatment**
**Theisen, W. and Ruttert, B.,** *Chair of Materials Technoilogy, Ruhr-Universität Bochum, Bochum, Germany*

**13:30 Development of protective coatings for gas turbines at MAN Diesel & Turbo**
**Herzog, R.,** *MAN Diesel & Turbo SE, Augsburg, Germany*

**14:00 Thermally sprayed protective coatings for high temperature applications**
**Vaßen, R.,** *Materials for power plant technology department, Recearch Center Jülich, Jülich, Germany*

**14:30 Summary**

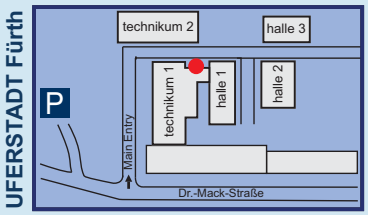
**14:45 Lab Tour**

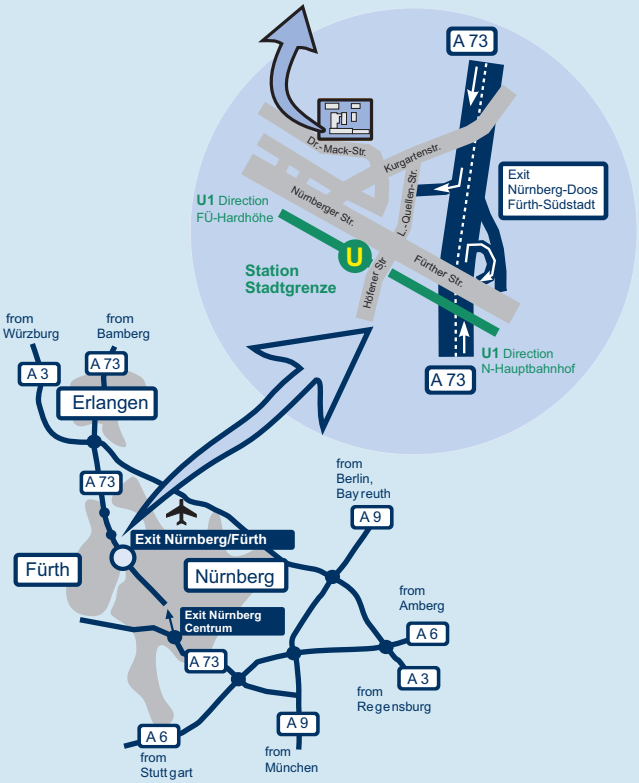


## VENUE

Colloquium venue is the conference room on the 6th floor of the "Neue Materialien Fürth GmbH“ in the Uferstadt of Fürth (5 min walk from the station „Stadtgrenze“ of the U1 underground line).

Neue Materialien Fürth GmbH
Dr.-Mack-Straße 81
90726 Fürth
Germany




## REGISTRATION

**15.02.2018** Registration deadline

150.- € Academic
300.- € Industry

The participation fee includes the colloquium documentation and catering.

In case of cancellation a processing fee of 50 € will be charged. If the cancellation is made within 5 days before the start of the conference, the full participation fee will be charged. Please transfer the fee only after receipt of the registration confirmation and the invoice.
We would like to draw your attention to the fact that your data will be stored in electronic form until completion of this event.

Further information about the Collaborative Research Centre SFB/Transregio 103, current events and the registration form can be found under:

www.sfb-transregio103.de/mainlinks/upcoming_events.php

## ORGANISATION

**Carolin Körner** **FAU Erlangen-Nürnberg**

**Gunther Eggeler** **Ruhr-Universität Bochum**

**Robert F. Singer** **Neue Materialien Fürth GmbH**

## CONTACT

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