



## ***THE FUTURE OF METALBEAMS - Open seminar***

**6 march 2019, 10AM - 12AM, room 5 at Skogshem och Wijk, Lidingö**

### **Program**

#### **Metalbeams – A platform for industrial access to large scale experimental facilities**

- Conclusions from two years of the BIR2Gain-project /The future of MetalBeams (Dmytro Orlov, Lunds universitet)
- Industrial perspectives (Magnus Andersson, SSAB, Mikaela Gustafsson, Sandvik Coromant)

#### **Inspirational examples - Presentation of projects**

- "Residual stress measurements in high strength steel after shearing operations" (Sven Erik Hörnström, SSAB)
- "3D characterisation of grain orientation induced braze alloy wetting" and "In situ-undersökning av aluminiumoxiduppbyggnad vid flussfri lödning" (Andreas Oskarsson, Gränges)
- "High-resolution characterisation of secondary carbide precipitation in martensitic steels", "High-resolution characterisation of chemically complex low alloyed high strength", martensitic steels and "Tomografi för rent stål" (Fredrik Lindberg, SWERIM)
- "COOLER - Investigation of early stages of phase decomposition in duplex stainless steels by in situ small angle neutron scattering", "SuperAvon - In-situ experiment to improve computational tools for duplex stainless steels", "HySteel - analys av restspänningar för utveckling av väte resistent hög hållfasta stål" and "FROST - Tools for development of stainless steels of the future (Rachel Pettersson, Jernkontoret)".

#### **Supporting activities**

- Vinnova's funding activities for industrial engagement in large scale n/x infrastructure (Maria Öhman, Vinnova)
- SWERIM's and RISE's new dedicated personnel resources in Lund (Fredrik Lindberg, SWERIM)

**Workshop: Industrial challenges that can (possibly) be met by large scale experimental facilities (se next page)**

**Time plan for future development of MetalBeams (Anna Ponzio, Jernkontoret)**

# ***Workshop***

## **Aim**

The aim of the workshop is to collect and group challenges in material and process development that could be met with dedicated use of large scale experimental facilities.

## **Method**

Introduction (Anna Ponzio & Rachel Pettersson) - 10 min

Workshop (all participants) – 35 min

Participants write their material analysis related challenges on post-it and place them in matrix like the one below.

Participants complete a prepared mapping of instrumental possibilities by post-its

Summary (Hilmar Vidarsson, Höganäs and Mats Qvarford, Tetra Pak) – 10 min

## **Preparation**

Think about and ask your colleagues what material and process challenges your organization has where investigations at large scale experimental facilities may be helpful.

## **Feed back**

The material collected will be used to identify areas interesting for common projects and strategies with respect to the large scale experimental facilities. Further, the map of the challenges will be connected to the map of the experimental facilities and used for a gap analysis in order to identify common interests in future development of infrastructure and the landscape of services surrounding them.

## Matrix challenges

Type of information needed →  ↓Area	Microstructures in 3D (static)	In situ (incl. time resolved)	In operando (time resolved, operational conditions)	Other
<b>Microstructure &amp; Phase transformation (bulk &amp; secondary phases)</b>	Multiphase microstructures Phase distribution (cemented carbide, bulk) AM (homogeneity grain size) Particle Size Distribution	Multiphase microstructures Rapid phase transformation Particle Size Distribution Adhesion and evolution of epitaxial films Sintering of cemented	Phase evolution during treatment	
<b>Defect analysis (volume)</b>	Inclusions AM porosity	Inclusions Thin foils??		
<b>Stress - Strain behaviour</b>	Thin film + bulk stress-strain behaviour Mapping of inserts (very small) AM (crack formation etc)	Stress behavior during temp. cycling (thin film + bulk)	Microstructure evolution during rolling, cutting etc. Stress relief of pressed parts during sintering Microstructure evolution during heat treatment	
<b>Dislocation structure and recrystallization</b>	Deformation microstructure Texture	Texture evolution Recrystallisation		
<b>Hydrogen embrittlement, carburization, nitriding</b>		Influence on diffusion of additives on grain recrystallisation How is hydrogen transported in metals		
<b>Interface &amp; surface chemistry (incl. corrosion)</b>		Thin film adhesion Thin foils	Weld joints and welding processes Alloy corrosion Biofilm formation - fouling	

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**Metalbeams** is a platform with the aim of promoting metals industry's use of large scale experimental facilities such as ESS, MAX IV and Petra III. The platform has been developed in two projects which ends on March 31, 2019.

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METALLISKA  
MATERIAL



Jernkontoret



Med stöd från



Strategiska  
innovations-  
program