

PROGRAMME

# 16<sup>th</sup> MAPEX Early Career Researcher Workshop

SCIENCE MEETS INDUSTRY  
*Career path in(to) the industry*

7<sup>th</sup> December 2023  
LION building (Klagenfurter Str. 5)



**MAPEX**

Materials Methods Technologies

**Early Career Researcher  
Workshop**

# Programme overview

7<sup>th</sup> December 2023

**9:30 Registration**

## Session 1

**10:00 Welcome and introduction**

**10:15 From metal nanocluster-based cancer therapies to synthetic polymer and ceramic innovations in tissue engineering and wound healing**

Dr. Deepanjalee Dutta

*Advanced Ceramics Group, University of Bremen*

**10:45 Bremen Early Career Researcher Development (BYRD): Central hub for supporting doctoral and postdoctoral researchers**

Dr. Diana Ebersberger

*BYRD, University of Bremen*

**11:00 Panel discussion – Moving from academia to industry** with

Dr. Felipe Macul Perez, *Bayer AG*

Dr.-Ing. Heike Sonnenberg, *ArianeGroup GmbH*

**11:45 Lunch break and discussion**

## Session 2

**12:45 Laser Metal Deposition – from lab to application**

Dr.-Ing. Thomas Seefeld

*BIAS - Bremer Institut für angewandte Strahltechnik GmbH*

**13:15 Panel discussion - Moving from academia to industry** with

Dr.-Ing. Marzellus große Holthaus, *BEGO GmbH & Co. KG*

Dr.-Ing. Laura Luhede, *Hitachi Zosen Inova BioMethan GmbH*

**14:00 Coffee break and discussion**

### Session 3

**14:30 Career Talk: Materials from Simulation to Sales: my career between industry and academia**

Prof. Dr.-Ing. habil. Rainer Fechte-Heinen

Leibniz-IWT

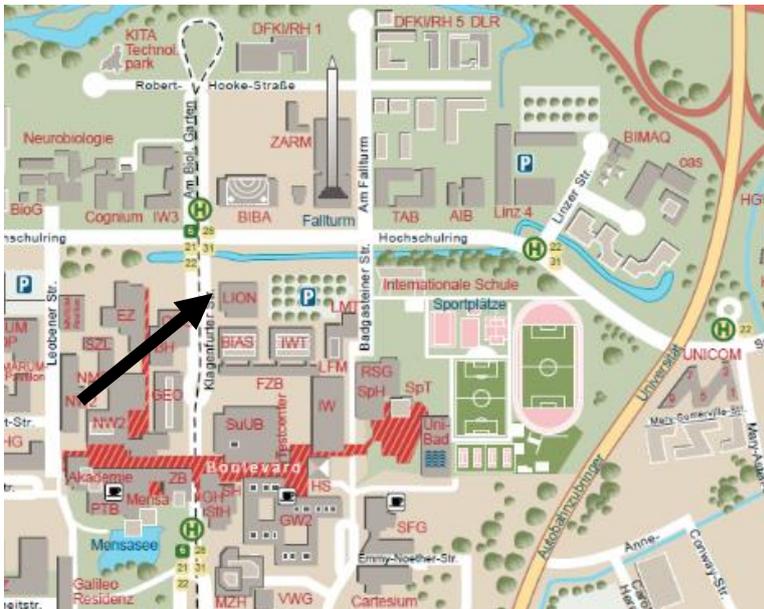
**15:30 Coffee break and discussion**

**15:45 End of programme**

**17:00 Social event – get together at Christmas Market**

## Venue of the workshop

LION building



Klagenfurter Str. 5  
28359 Bremen  
Ground floor

## Organizing committee

Hanna Lührs, Enis Bicer, Touhidul Islam, Britta Hinz

# Session 1

## 10:00 Welcome and introduction

**Hanna Lührs, Enis Bicer**

*MAPEX Center for Materials and Processes*

## 10:15 From metal nanocluster-based cancer therapies to synthetic polymer and ceramic innovations in tissue engineering and wound healing

**Dr. Deepanjalee Dutta**

*Advanced Ceramics Group, University of Bremen*

In recent years, the field of material science has witnessed significant strides in the development of functional biomaterials, presenting diverse opportunities for addressing critical healthcare challenges. This talk provides insights into two compelling perspectives within this realm, with a focus on utilizing biomaterials for alternative cancer therapies and advancing tissue engineering and wound healing applications.

The first segment of the talk explores the forefront of cancer research, emphasizing the use of metal nanocluster-based biomaterials. These nanoclusters, grounded in proteins, DNA, and natural biopolymers, offer a promising avenue for the development of innovative approaches in cancer therapy and diagnostics. The discussion delves into the unique properties of metal nanoclusters and their potential applications, showcasing their role in pioneering alternative strategies to combat cancer.

The second perspective shifts towards the development of biomaterials supporting tissue growth, with a particular emphasis on synthetic acrylate-based polymers and ceramics. This section highlights the versatility of these materials in fostering the growth of bone and skin cells. The talk explores strategies and advancements in creating biomimetic environments that mimic the natural extracellular matrix, facilitating optimal cell proliferation and tissue regeneration.

A portion of the presentation is dedicated to the development of a ceramic-based bacteria-capturing wound dressing. The potential of this innovative biomaterial for practical implementation in clinical settings is also discussed. Due to the unique nature of the ceramic-based dressing its ability to capture bacteria, presents a promising solution for combating wound infections.

Overall, this talk encapsulates the diverse landscape of functional biomaterials, showcasing their pivotal role in advancing cancer therapies, tissue engineering, and wound healing. The exploration of metal nanoclusters, synthetic polymers and ceramic materials provides a

comprehensive perspective on the exciting possibilities and translational potential of biomaterials in modern healthcare.



**My current role:** Post doctoral scientist

**Describing my daily work in one sentence:** Whether immersed in the creative solitude of my office for writing or donning the role of a scientist within the lab, where the laminar hood and microscope become my tools of exploration, my professional life seamlessly oscillates between the realms of storytelling and scientific curiosity.

**Major milestones of my career:** Cracking the highly competitive all India PhD entrance examination, finding a post doc research position at the University of Edinburgh, UK, joining as a post doc in the MIMENIMA research training group in Uni Bremen.

**10:45 Bremen Early Career Researcher Development (BYRD): Central hub for supporting doctoral and postdoctoral researchers**

**Dr. Diana Ebersberger**

*BYRD – Bremen Early Career Researcher Development,  
University of Bremen*



Bremen Early Career Researcher Development (BYRD) is the hub for all early career scientists of the University to receive information and training for their personal and career development. BYRD's mission is to connect early career researchers, to foster their independent research skills and to provide means for individual personality development. Its comprehensive course program covers topics such as academic writing and publishing, planning a doctoral project, scientific integrity, presenting and networking, research methods, as well as career orientation for academia and industry. The courses as well as personal consultations are aimed at doctoral and postdoctoral researchers across all disciplines and all stages.

11:00

**Panel discussion 1:  
Moving from academia to industry**

**Dr. Felipe Macul Perez**

*Bayer AG*



**My current role:** Asset Care digitalization and strategy manager

**Describing my daily work in one sentence:** I strive to ensure that our production facilities have the proper resources to maximize equipment reliability

**Major milestones of my career:**

- Master's exchange at Imperial College of London (Materials Science)
- PhD at University of Bremen (Materials Engineering)
- Startup founder on advanced cosmetics (sponsored by Fraunhofer)
- Leadership Trainee at Bayer AG - Consumer Health
- Digitalization Strategist at Bayer AG - Crop Science

**Dr.-Ing. Heike Sonnenberg**

Development Engineer

*ArianeGroup GmbH*



**My current role:** I am working as a development engineer in the predevelopments department at ArianeGroup GmbH in Bremen. With my background in materials science, I support the team “Advanced Technologies, Materials and Concepts” for the development of future launchers architecture, especially future Upper Stages.

**Describing my daily work in one sentence:** I am managing work packages with different research institutes and suppliers regarding cryogenic tests of composite and/or metallic structures for an application in a future Upper Stage with e. g. cryogenic composite tanks.

**Major milestones of my career:**

- Study of Aerospace Engineering at FH Aachen
- Research Fellow at Leibniz-IWT/University of Bremen with PhD in 2022
- Development Engineer at ArianeGroup GmbH since 12/2022

# Lunch break 11:45 – 12:45

Lunch at the Mensa

## Session 2

### 12:45 Laser Metal Deposition – from lab to application

**Dr.-Ing. Thomas Seefeld**

*Head of Department - Material Technology and Processes  
BIAS - Bremer Institut für angewandte Strahltechnik GmbH*

Laser Metal Deposition (LMD) describes a family of laser-based processes that commonly apply continuously fed powder material for the deposition of 2D and 3D structures. Industrial applications include laser overlay welding of functional surface claddings from metal or hard particle reinforced MMC materials for wear or corrosion resistance, repair welding of high-value machine parts like turbine blades, and more recently additive manufacturing of freeform components without the restrictions set by cartesian systems and build chambers.

The talk highlights some of our current research in this field including a novel high-speed process that uses up to 100 m/min of welding speed in Laser Melt Injection of hard particles to produce functional surface layers on skin pass rolls that feature a high-low structure that can be transferred to the rolled sheet metal. As a next step, understanding the wetting and incorporation behavior of hard particles in such high-speed processes the target of ongoing research.

Online process monitoring of the temperature field and multi-parameter closed-loop process control in LMD have been demonstrated by BIAS. Currently we have a strong research focus on powder stream characterization methods, understanding the effects of processing conditions on powder stream propagation and powder interaction with the laser beam and melt pool. For the first time, a novel powder stream online monitoring approach allows us to detect failure of powder feeding during laser-on time and even deviations in the fed powder quantities.

To further advance the LMD technology and make it viable for the purpose of high-throughput materials development, the University of Bremen has recently been granted a unique LMD machine that will allow

for flexible synthesis through in-situ alloying and integrated heat treatment for microstructure adjustment, extensive online process characterization and data-based computational prediction of LMD process routes. This approach and the features of the device will be presented.



**My current role.** Head of Department and Principal Investigator for Materials and Process Technology in BIAS

**Describing my daily work in one sentence:** Keep pushing...

**Major milestones of my career:** I studied Materials Science at the University of Erlangen-Nuremberg and received my Dr.-Ing. in Production Technology from the University of Bremen. Thesis: „Laser alloying and cladding at elevated processing speed for aluminum crankcase application“.

Since 1995 I was a research associate in laser materials processing at BIAS and became head of the Laser Materials Processing department at BIAS in 2000. Focus of my R+D work is in the field of materials and process behavior during laser processing of metals, including process and technology development for laser joining, laser surface modification and additive manufacturing.

**13:15 Panel discussion 2:  
Moving from academia to industry**

**Dr.-Ing. Laura Luhede**

*Hitachi Zosen Inova BioMethan GmbH*



**My current role:** Product & Marketing Manager

**Describing my daily work in one sentence:** 360° view on three product lines, from development to end of life cycle, being the interface between different departments, top management, customers, suppliers, ...

**Major milestones of my career:** PHD in 2022

## Dr.-Ing. Marzellus große Holthaus

Managing Director at BEGO Implant Systems

BEGO GmbH & Co. KG



**My current role:** I´m a managing director of a family-owned dental company in Bremen that produces products for dentists and dental laboratories to enable and promote aesthetic dentures and the dental health of patients.

**Describing my daily work in one sentence:** As a Chief Operating Officer (COO) I´m responsible for the processes and employees within production, logistics, warehouse management, customs & export processes and as well for quality management and quality assurance topics in-house and for our external suppliers and a large part of my day consists of discussions and brainstorming on current projects e.g. to optimize processes within the production or supply chain via automatization and Employee management with team members or my direct reports, the managers of the operational departments.

### Major milestones of my career:

- Graduation University of Applied Sciences Bremerhaven „Medical Engineering“ in 2005.
- Graduation University of Applied Sciences Münster „Biomedical Engineering“ in 2007.
- PhD University of Bremen (PhD) „Advanced Ceramics“ in 2011.
- Starting at BEGO as an Engineer for ceramic materials in 2011.
- Becoming Managing Director in 2020.

## Coffee break 14:00 – 14:30

Time for discussion

## Session 3

### 14:30 **Career talk: Materials from Simulation to Sales: my career between industry and academia**

**Prof. Dr.-Ing. habil. Rainer Fechte-Heinen**

*Materials Engineering/Metals, Production Engineering, University of Bremen  
Director Leibniz-Institute for Materials Engineering  
Director MPA Bremen Institute for Materials Testing*

In this talk, I would like to give some insight to the experiences gained in my career as an academic and industrial materials engineer. I started in materials simulation of shape memory alloys, then changed to industrial research and development in the steel industry and finally came back to academia in 2020 when I joined University of Bremen and the Leibniz-Institute for materials engineering (IWT). The talk shall introduce the different topics I have been working on, but also focus on the personal experiences on differences the working culture between industry and academia and the responsibilities of a leader in both contexts. An overview of my research in the field of materials engineering of metals at University of Bremen and the Leibniz-IWT will also be given, covering topics like additive and conventional manufacturing and tuning of materials properties, for instance by heat treatment and coating, and materials characterization by methods like electron microscopy, atom probe tomography, X-ray analysis and mechanical testing.



**My current role:** Executive director of Leibniz-IWT, full professor at university of Bremen, deputy head of the U Bremen Research Alliance.

**Describing my daily work in one sentence:** Luckily, every day is quite different, but usually, it may contain management tasks such as representing the institute in different occasions, signing contracts and HR management together with my department heads, scientific tasks like writing reviews for research proposals of other groups (DFG and IGF, a funding for applied research with industry) and discussing our own project applications, and education including talks with PhD candidates and teaching basics of materials engineering in BSc-courses.

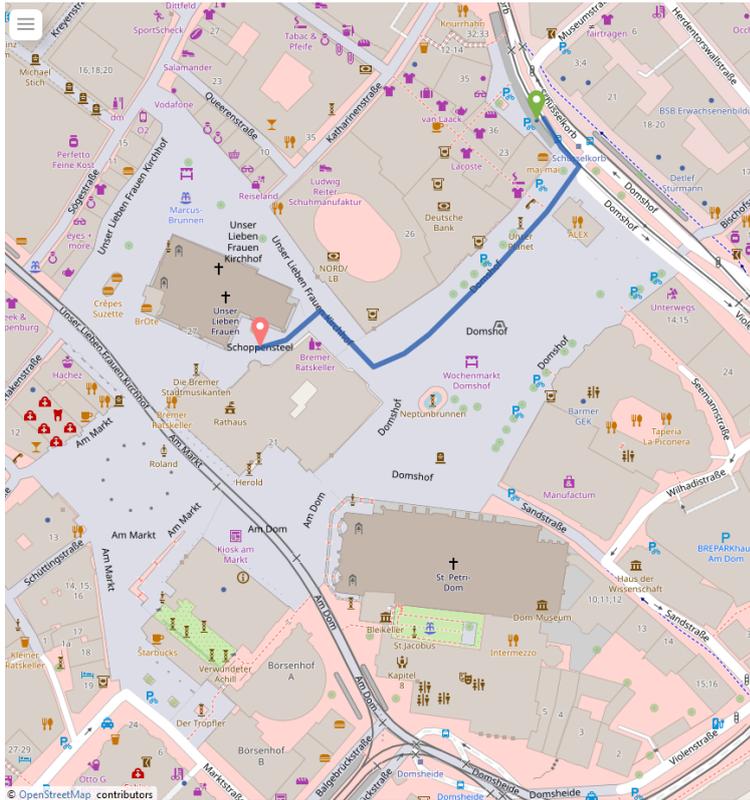
**Major milestones of my career:** PhD student in a DFG-funded Cooperative Research Center on Shape Memory Technology, project leader in industrial materials optimization, manager responsible for different departments in innovation management, head of product development, and finally professorship at University of Bremen combined with responsibility for Leibniz-IWT.

# Coffee break 15:30 – 15:45

Time for discussion and end of workshop

# 17:00 Christmas Market Bremen

## Location



In front of the Bremen Ratskeller booth in the city centre - nearby to the famous statue of the “Town Musicians of Bremen”

Am Markt/Schoppensteel  
28195 Bremen

*Directions:*

**Tram lines 4, 6, 8; Bus lines 24, 25:**

Get out at stop “Schüsselkorb” and walk to destination

**Tram lines 2, 3, 4, 6, 8; Bus lines 24, 25:**

Get out at stop “Domsheide” and walk to destination

# MAPEX

## Doctoral Qualification Programme



In addition to their scientific education, MAPEX supports doctoral candidates in acquiring transversal skills and competencies needed for taking over leadership tasks inside or outside of academia after the successful completion of their doctorate.

The MAPEX Doctoral Qualification Programme offers the following benefits to its members:

- a **milestone-based programme** covering five qualification areas,
- a **transcript of records** summarising achieved milestones,
- a comprehensive **summary of training courses** and **workshops** offered by various institutions at the University of Bremen,
- **individual consultation** and **advice** with regard to their doctoral qualification process and the development of their personal competencies,
- **workshops** and **networking events** specifically targeted at early career researchers from MAPEX disciplines,
- the access to **MAPEX funding** for research stays abroad, materials analytics and organization of scientific workshops.

### Contact and more information:



MAPEX-QP

# MAPEX

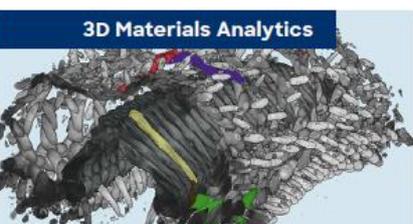
## Core Facility for Materials Analytics

A unique combination of cutting-edge instruments for the structural and chemical characterization of materials is being established within the University of Bremen by MAPEX in the form of the **MAPEX Core Facility for Materials Analytics (MAPEX-CF)**.

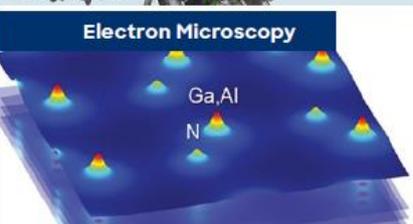


As a user facility, the MAPEX-CF allows scientists from several disciplines to share and access a wide range of high-performance scientific equipment in the investigation areas of **Electron Microscopy**, **3D Materials Analytics**, **Surface Analytics**, **X-ray Diffraction**, and **Spectroscopy**.

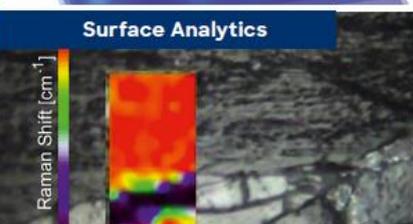
For an overview of instrumentation available in the research groups of MAPEX members, use the **Instrument Database** on the MAPEX-CF website.



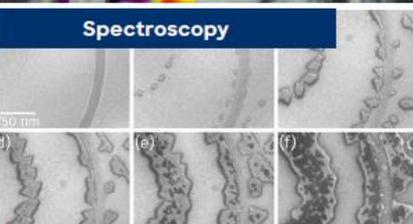
We use X-rays to non-destructively inspect the three-dimensional distribution of matter inside the object of investigation.



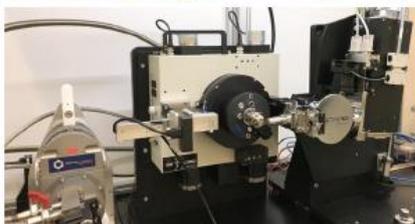
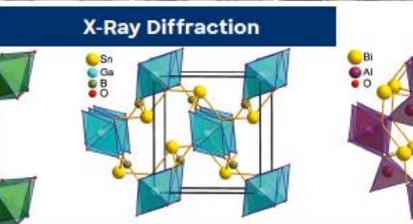
We investigate our samples using high-energy electron beams to obtain images with resolution down to the atom scale.



We combine microscopic and spectroscopic techniques to monitor processes at materials surfaces.



We perform in-situ and real-time chemical, electronic and optical characterization of materials under different conditions, e.g. to identify and map different phases.



We support structure investigations of materials from crystalline nano-materials to macroscopic single crystals at ambient and non-ambient conditions.

# Funding

MAPEX and the MAPEX-CF also support Early Career Researchers by providing **funding** for short-term **research projects**, **materials analysis**, **workshops**, and **more**.

## Research grants for Early Career Researchers:



## Contact and more information:



MAPEX



MAPEX-CF

# Notes

## 16<sup>th</sup> MAPEX Early Career Researcher Workshop

Under the motto '**Science meets Industry**' the workshops aims to give you the opportunity to interact with people who successfully made the transition from science to industry. The event will consist of moderated discussions with panellists who have embarked on different career paths outside the university. Talks and keynotes by Early Career and Principal Investigators will be offered, who will present their research and personal career path within and outside of academia. In between the sessions, there will be plenty of opportunities to get in personal touch and discussion with the speakers, panellists and peers.

**University of Bremen**  
**MAPEX Center for Materials and Processes**  
[www.uni-bremen.de/mapex](http://www.uni-bremen.de/mapex)

