

# **2<sup>nd</sup> International SIIRI Symposium 2024**

**January 24<sup>th</sup> - 25<sup>th</sup>, 2024**

**Courtyard Hannover Maschsee**

*Arthur-Menge-Ufer 3, 30169 Hannover*





## **2nd International SIIRI Winter School**

Interdisciplinary Implant Sciences

**January 22 – 23, 2024**



## **2nd International SIIRI Symposium**

**January 24 – 25, 2024**



### **Impressum**

CRC Safety-Integrated and Infection-Reactive Implants (SIIRI)

Lower Saxony Centre for Biomedical Engineering,

Implant Research and Development (NIFE)

Phone: +49 511 532 63122

Phone: +49 511 532 1406

siiri@mh-hannover.de

Dear Colleagues,

The 2<sup>nd</sup> International Symposium of the Collaborative Research Center (CRC) SIIRI will be held at the Courtyard Hannover Maschsee from January 24<sup>th</sup> to 25<sup>th</sup>.

The interdisciplinary CRC SIIRI is funded by the German Research Foundation (DFG) and aims at the development of new strategies for the prevention, detection and treatment of implant-associated complications in order to ensure long-term implant safety in various medical disciplines.

At the International SIIRI Symposium, we will focus on novel developments in implant medicine, with particular emphasis on new concepts for implant safety, digital implant lifecycle management, implant developments in materials science and new strategies to detect, prevent and combat biological implant-associated complications. Further topics will be biointerfaces and micro environments as well as new strategies for implant functionalization and implant-associated sensor technology.

The symposium will bring together national and international experts from various areas of medicine, engineering, natural and social sciences to promote scientific exchange. You can expect an exciting interdisciplinary scientific program with inspiring lectures by international and SIIRI speakers, poster presentations and round table discussions.

We look forward to welcoming you to our 2nd International SIIRI Symposium in Hannover!



Meike Stiesch  
Spokesperson of CRC SIIRI



Hans Jürgen Maier  
Deputy Spokesperson of CRC SIIRI

# SCIENTIFIC PROGRAM

## January 24, 2024

# WELCOME

**08:00**      **Coffee and Registration**

# OPENING

**08:30**      **Meike Stiesch**  
**Spokesperson TRR 298 –SIIRI**  
**(Safety-integrated and infection-reactive implants)**

**Michael Manns**  
**President Hannover Medical School**

**Volker Epping**  
**President Leibniz University Hannover**

**Falco Mohrs**  
**Lower Saxony's Minister for Science and Culture**

# BIOMATERIAL-ASSOCIATED BIOFILM INFECTIONS (PART 1)

Chair: Meike Stiesch

Auditorium, Room 5

- 09:00**      Implant-associated infections in orthopedic and trauma surgery – A combined experimental and clinical perspective  
**Volker Alt, Regensburg, Germany**
- 09:40**      Peri-implant microbiome in health and disease  
**Egija Zaura, Amsterdam, Netherlands**
- 10:20**      Bacterial adaptation to biofilm growth  
**Susanne Häußler, SIIRI, Hannover, Germany**

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**10:40**      **Coffee break**

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# BIOMATERIAL-ASSOCIATED BIOFILM INFECTIONS (PART 2)

Chair: Henning Menzel

Auditorium, Room 5

- 11:10** Associations and causality of peri-implant and periodontal diseases with systemic diseases  
**James Deschner, Mainz, Germany**
- 11:50** Uncovering of molecular mechanisms involved in biofilm-associated peri-implant infections  
**Meike Stiesch, SIIRI, Hannover, Germany**
- 12:10** Controlled drug release from modified cells using physical and physiological triggers  
**Dagmar Wirth, SIIRI, Braunschweig, Germany**

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**12:30** Lunch

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# BIOINTERFACES

Chair: Dagmar Wirth  
Auditorium, Room 5

- 13:30** Overcoming biological barriers in infectious diseases - Complex in vitro models and advanced drug delivery approaches  
**Claus-Michael Lehr, Saarbrücken, Germany**
- 14:10** The synovium, biointerface between joint capsule and implant: Altered functions in revision arthroplasties  
**Andrea Hoffmann, SIIRI, Hannover, Germany**
- 14:30** On the thermodynamics of biofilm growth  
**Philipp Junker, SIIRI, Hannover, Germany**

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**14:50** **Coffee Break**

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# INTRACORPOREAL AND IMPLANT-ASSOCIATED SENSING

Chair: Henning Windhagen  
Auditorium, Room 5

- 15:20** The challenges and opportunities of implantable sensors  
**Ben M. Maoz, Tel Aviv, Israel**
- 16:00** Sensor principles and their applications in SIIRI  
**Merle Sehlmeier, SIIRI, Hannover, Germany**
- 16:20** Autonomous chemical sensor-actuator systems for the detection and control of implant-associated infections  
**Henning Menzel, SIIRI, Braunschweig, Germany**
- 16:50** Optical sensing and detection of infections in implantology  
**Alexander Heisterkamp, SIIRI, Hannover, Germany**

# CONSIDERING SEX AND GENDER IN IMPLANT SCIENCE

Chair: Anette Melk

Auditorium, Room 5

**17:00**      Gendered innovations in health and  
biomedicine  
**Londa Schiebinger, Stanford, California,  
USA (hybrid)**

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**17:45**      **Round Table Discussions on Hot Topics in  
Implant Research**

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**18:30**      **Poster Session and Get Together**

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# **SCIENTIFIC PROGRAM**

## **January 25, 2024**

# WELCOME

## NEW APPROACHES TO IMPLANT DEVELOPMENT IN MATERIALS SCIENCE

Chair: Hans Jürgen Maier

Auditorium, Room 5

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|-------|--|
| 09:00 | Development of biodegradable surgical wires for veterinary medicine<br><b>Andrij Milenin, Krakow, Poland</b>   |
| 09:40 | Integrating machine learning into metallurgy: road map to novel implants<br><b>Demircan Canadınç, İstanbul, Turkey</b>   |
| 10:20 | Micro- and nanostructured surfaces and materials to control cell and bacterial surface interactions<br><b>Peter Kingshott, Melbourne, Australia</b>            |
| 10:40 | Recent insights into a niobium-base alloy as an implant material<br><b>Julian Schleich, SIIRI, Hannover, Germany</b>   |
| 11:00 | A 3D in vitro-model of implant-associated osteomyelitis: from biomimetic materials to multicellular systems<br><b>Cornelia Lee-Thedieck, Hannover, Germany</b> |
| 11:20 | <b>Coffee Break</b>  |

# IMPLANT TECHNOLOGIES

**Chair: Susanne Häußler**

**Room 6**

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|--------------|---|
| <b>09:40</b> | The Effects of different grading approaches on peri-implant bone stress in additively manufactured dental implants<br><b>Osman Akbas, Hannover, Germany</b>   |
| <b>10:00</b> | Phenotype of mesenchymal stromal cell and articular chondrocyte cocultures on highlyporous bilayer PLLA scaffolds produced by thermally induced phase separation and supplemented with hydroxyapatite<br><b>Camilla Carbone, Palermo, Italy</b> |
| <b>10:20</b> | Mitigating stress shielding in dental implants through topology optimization and fatigue modeling<br><b>Hüray İlayda Kök, Hannover, Germany</b>   |
| <b>10:40</b> | Native proteins in tissue engineered scaffolds<br><b>Sara Leal-Marin, Hannover, Germany</b>   |
| <b>11:00</b> | Biomimetic bone implants: Developing a 3D-printable nanohydroxyapatite/methacrylated gelatine-based nanocomposite hydrogel<br><b>Nadine Schadzek, Hannover, Germany</b>   |
| <b>11:20</b> | <b>Coffee Break</b>   |

# ACCEPTANCE OF MEDICAL TECHNOLOGY INNOVATIONS

Chair: Eva Baumann

Auditorium, Room 5

**11:40** Taking the agency of medical technology users and social concerns seriously  
**Christopher Coenen, Karlsruhe, Germany**

**12:20** Barriers and facilitators of information seeking about medical innovations in the public  
**Elena Link, SIIRI, Mainz, Germany (hybrid)**

**12:40** The role of language regarding the acceptance of smart implants  
**Charlotte Schrimpf, SIIRI, Hannover, Germany**

**13:00** Results Round Table Discussion

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**13:10** **Lunch**

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# IMPLANT SAFETY AND DIGITAL IMPLANT LIFECYCLE MANAGEMENT

**Chair: Peter Wriggers**  
**Auditorium, Room 5**

- 14:00**      Certification and management of  
endoprosthetics centers  
**Gabriela von Lewinski, Göttingen, Germany**
- 14:40**      Implant safety in joint replacements  
**Jan-Philippe Kretzer, Heidelberg, Germany**
- 15:20**      NeWTranslation - Implant Lifecycle  
Management software support for the  
development of medical devices up to the  
first-in-man study  
**Simon Pieske, Aachen, Germany**
- 15:40**      Digital Implant Lifecycle Management –  
Implant monitoring from the idea to a digital  
twin  
**Marcel Wichmann, SIIRI, Hannover,  
Germany**

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**16:00**      **Closing Remarks and End of Symposium**

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# CRC Safety-Integrated and Infection-Reactive Implants (SIIRI)

## Spokesperson

Meike Stiesch  
Department of Prosthetic Dentistry and  
Biomedical Materials Science  
Hannover Medical School

## Deputy Spokesperson

Hans Jürgen Maier  
Institute of Materials Science,  
Hannover Centre for Production Technology  
Leibniz University Hannover

## CONTACT INFORMATION CRC / TRR 298 SIIRI

Claudia Davenport and Marly Dalton  
Hannover Medical School (MHH)  
Lower Saxony Centre for Biomedical Engineering,  
Implant Research and Development (NIFE)  
Phone: +49 511 532 63122  
Phone: +49 511 532 1406  
[siiri@mh-hannover.de](mailto:siiri@mh-hannover.de)

## Institutions:



SIIRI has been funded by the  
German Research Foundation  
(DFG) since 2021

