

**International Colloquium**  
**on**  
**Interactive Soft-Stiff-Composites**  
–  
From Basic Research into Practice  
**Deutsches Hygiene-Museum Dresden**  
**May 27-28, 2024**

RESEARCH TRAINING GROUP 2430  
„Interactive Fiber Rubber Composites“

**Scientific Advisory Board**

Prof. Dr. Iain Anderson/ University of Auckland, New Zealand  
Prof. Dr. James Busfield/ Queen Mary University of London, UK  
Prof. Dr. Ulrich Giese/ Deutsches Institut für Kautschuktechnologie e. V., Germany  
Prof. Dr. Heinrich/ TUD Dresden University of Technology, Germany  
Prof. Dr. Annika Raatz/ Leibniz University Hannover, Germany  
Dr. Christopher Robertson/ Polymer Technology Services LLC, USA  
Dr. Toshio Tada/ Sumitomo Rubber Industries, LTD., Japan

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 **DFG** Deutsche  
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# May 27<sup>th</sup>, 2024



09:00 – 09:15 **Welcome Address**  
Prof. Chokri Cherif  
*TU Dresden, Institute of Textile Machinery and High Performance Material Technology*

09:15 – 09:25 **Welcome Address of the International Office**  
Maïke Heitkamp-Mai  
*TU Dresden, School of Engineering Science*

## Part 1: Material Development

09:25 – 09:50 **Potentials of all Conductive Polymer-based Fibrous Ionic Actuators for Interactive Fiber-Elastomer Composites**  
Mathis Bruns  
*TU Dresden, Institute of Textile Machinery and High Performance Material Technology*

09:50 – 10:15 **Monitoring of Composite Structures: The Predictive Maintenance Concept**  
Prof. Vladan Koncar  
*École Nationale Supérieure des Arts et Industries Textiles (ENSAIT) – Université de Lillé*

10:15 – 10:40 **Simulation Based Development of Interactive Fiber Rubber Composites Subjected to Multi-Dimensional Deformations**  
Achyuth Ram Annadata  
*TU Dresden, Institute of Textile Machinery and High Performance Material Technology*

10:40 – 11:10 **COFFEE BREAK**

11:10 – 11:35 **Electroactive Yarn Actuators for Mechanically Active Wearables**  
Prof. Edwin Jager  
*Sensor and Actuator Systems (SAS), Linköping University*

11:35 – 12:00 **Liquid Metal Embedded Soft and Multifunctional Elastomeric Architectures for Soft Matter Engineering**  
Prof. Shib Shankar Banerjee  
*Department of Materials Science and Engineering, Indian Institute of Technology Delhi*

12:00 – 12:25 **Soft Sensor Fiber Rubber Composites – What are the Challenges?**  
Dr. Frank Clemens  
*Swiss Federal Laboratories for Materials Science and Technology (EMPA)*

12:25 – 12:50 **Dielectric Elastomer Actuators Based on Functionalized Liquid Isoprene Rubber**  
Jishnu Nirmala Suresh  
*Leibniz Institute of Polymer Research Dresden e.V.*

12:50 – 14:20 **LUNCH BREAK**

## Part 2: Modelling and Simulation

14:20 – 14:45 **Investigating the Effects of Microstructure Evolution on the Behavior of Magneto-Active Elastomers with the Help of a Physical Model**  
Mehran Roghani  
*Leibniz Institute of Polymer Research Dresden e.V.*

14:45 – 15:10 **Magnetically Induced Internal Restructuring and Changes in the Material Properties of Magnetosensitive Elastomers**  
Prof. Andreas Menzel  
*Otto von Guericke University Magdeburg, Department Theory of Soft Matter / Biophysics*

15:10 – 15:35 **Thermo-Mechanical Properties of Elastomers Determined by Molecular Dynamic Simulations**

Tannaz Alamfard

*TU Dresden, Institute of Power Engineering*

15:35 – 16:00 **COFFEE BREAK**

16:00 – 16:25 **Meso-Scale Modeling of Magneto-Active Elastomers with Soft-Magnetic Inclusions Considering Thermal Effects and Interface Debonding**

Will Klausler

*TU Dresden, Institute of Structural Analysis*

16:25 – 16:50 **RTG 2868:  $D^3$  – Data-Driven Design of Resilient Metamaterials**

Prof. Markus Kästner

*TU Dresden, Institute of Solid Mechanics*

16:50 – 17:15 **Dielectric Elastomer Transducers – Modelling, Design, Fabrication and Applications**

Prof. Jürgen Maas

*Technical University of Berlin, Mechatronics Systems Lab*

19:00

**DINER**

**May 28<sup>th</sup>, 2024**



### **Part 3: Regulation and Control**

09:00 – 09:25 **Metrological Investigation and Modeling of DEAs Based on Alternative Electroactive Polymers**

Hans Liebscher

*TU Dresden, Institute of Solid State Electronics*

09:25 – 09:50 **Highly Anisotropic Carbon Fiber Electrodes for DEAs and Their Dynamic Non-Monotonic Conductive Properties**

Markus Koenigsdorff

*TU Dresden, Institute of Solid State Electronics*

09:50 – 10:15 **Fiber-Reinforced DEAs: Exploring Anisotropic Designs and Instabilities**

Stefania Konstantinidi

*Center for Artificial Muscles (CAM), Swiss Federal Institute of Technology Lausanne (EPFL)*

10:15 – 10:40 **Design and Fabrication of Dielectric Elastomer Actuators**

Simon Holzer

*Center for Artificial Muscles (CAM), Swiss Federal Institute of Technology Lausanne (EPFL)*

10:40 – 11:10 **COFFEE BREAK**

11:10 – 11:35 **New Perspectives on Self-Monitoring of Internal Rubber Failure Using Piezoresistivity**

Dr. Evghenii Harea

*Centre of Polymer Systems, University Institute, Tomas Bata University in Zlín*

11:35 – 12:00 **Modeling and Control of Soft Actuators Driven by Shape Memory Alloys (SMA)**

Aline Iobana Acevedo Velazquez

*TU Dresden, Institute of Control Theory*

12:00 – 12:25 **Dielectric Elastomers for Textile Integrated Sensing and Audio-Tactile Feedback**  
Prof. Paul Motzki  
*ZeMA – Center for Mechatronics and Automation Technology, Saarland University*

12:25 – 14:00 **LUNCH BREAK**

## Part 4: System Development and Characterisation

14:00 – 14:25 **From Optimization to 3D-Printing: A New Tool for Methodical Development of Compliant Mechanisms**  
Joanna Wollmann  
*TU Dresden, Institute of Lightweight Engineering and Polymer Technology*

14:25 – 14:50 **High Performance Magnetorheological Fluids Based on Cross-Scale Particles**  
Prof. Xufeng Dong  
*School of Materials Science and Engineering of Dalian University of Technology*

14:50 – 15:15 **Evaluation of Different Imaging Processes for the Detection of Damages in Fiber Elastomer Composites**  
Anett Endesfelder  
*TU Dresden, Institute of Materials Science*

15:15 – 15:40 **Soft Material Robotics – From Fundamentals to Applications**  
Jan Peters  
*Leibniz University Hannover, Institute of Assembly Technology and Robotics*

15:40 – 16:05 **COFFEE BREAK**

16:05 – 16:30 **Development of Active Multi-Matrix Composite (MMC) Components for Compliant Mechanism**  
Zhenbi Wang  
*TU Dresden, Institute of Lightweight Engineering and Polymer Technology*

16:30 – 16:55 **Active Tire Treads with Smart Elastomers and Sensors: Sumitomo's Innovative Concept for the Future Mobile Society**  
Dr. Toshio Tada  
*Sumitomo Rubber Industries, Ltd., Japan*

16:55 – 17:20 **Influence of Crack Precursors on the Strength and Durability of Reinforced Elastomers**  
Dr. Christopher Robertson  
*Polymer Technology Services LLC, Akron, OH, USA*

## Organization & Coordination

TU Dresden, Institute of Textile Machinery and High Performance Material Technology  
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You want to attend online or in person?

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or email to

[grk2430@mailbox.tu-dresden.de](mailto:grk2430@mailbox.tu-dresden.de)

## Location

Deutsches Hygiene-Museum, Lingnerplatz 1, 01069 Dresden, Germany

### CAR ROUTE

Highway A4, Hellerau exit or Altstadt exit, direction Zentrum  
Pay parking area is in front of the location

### TRAMS

Lines 1, 10, Stop: Georg-Arnhold-Bad / Deutsches Hygiene-Museum  
Lines 2, 4, 12, Stop: Deutsches Hygiene-Museum

