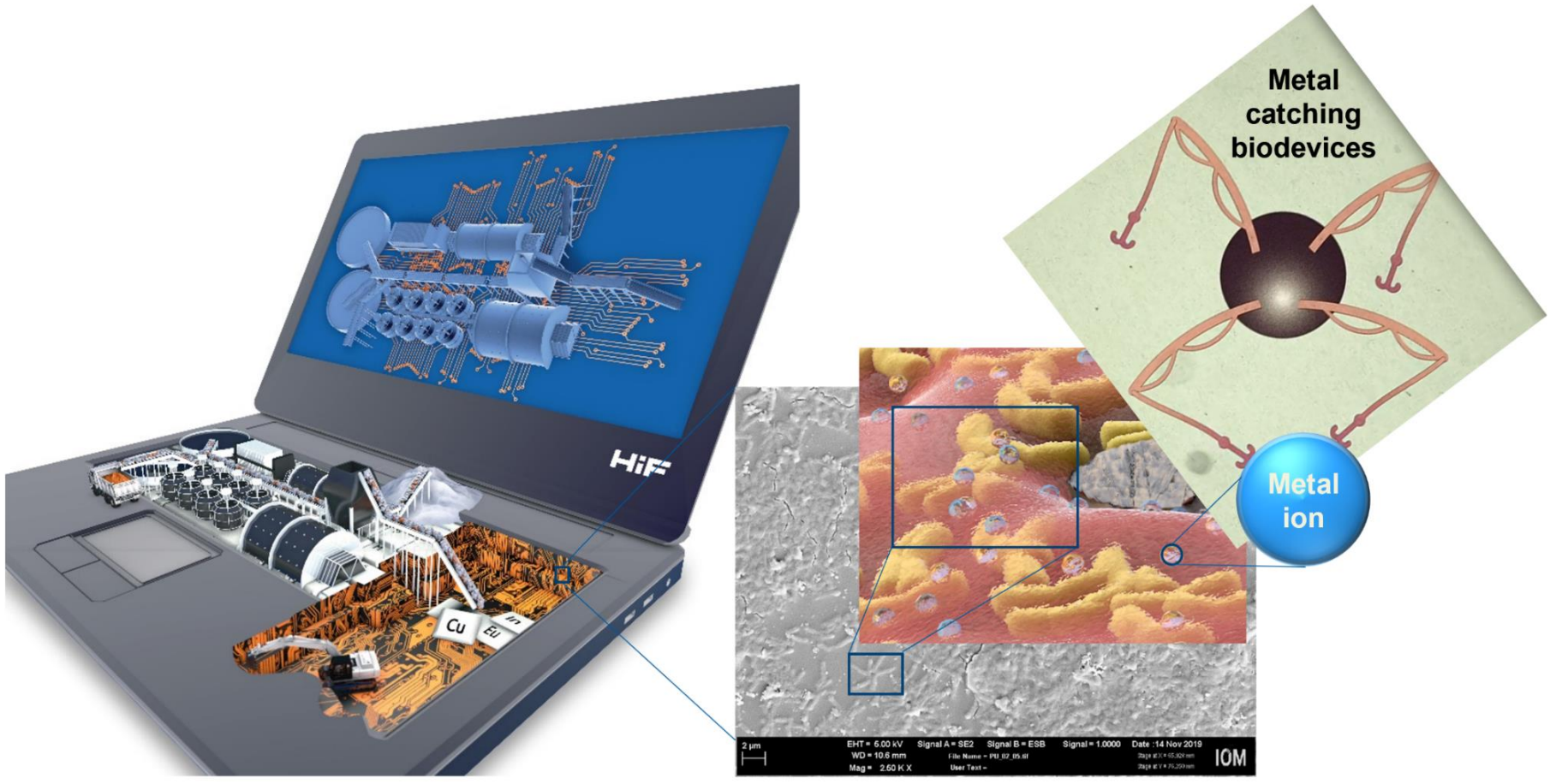
The JungeChemieForum Chemnitz invites you to:

Biomolecular Toolbox for Resource Recovery

A lecture by Dr. Franziska Lederer

Helmholtz-Zentrum Dresden-Rossendorf



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9:30 Uhr

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Guests are welcome !

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Any questions? Just write to us!
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TECHNISCHE UNIVERSITÄT CHEMNITZ
IN DER KULTURHAUPTSTADT EUROPAS

Chemnitz JCF

Dr. Franziska Lederer

Helmholtz-Zentrum Dresden-Rossendorf

Head of the BioKollekt research group

Biomolecular Toolbox for Resource Recovery

Global challenges for the extraction of raw materials are constantly increasing. Decreasing metal contents of ore bodies and increasing ore complexities require more and more processing steps, which cause serious environmental problems. The demand for raw materials has increased worldwide due to new technologies, the growing complexity of the products composition as well as growing populations. However, at the end of a high-tech product's lifetime, only the two to three most abundant elements are extracted while the majority of elements get lost. To strengthen a sustainable circular economy novel recycling strategies need to be developed that combine efficiently working traditional recycling steps with novel recycling steps to extract and reuse the majority of elements of our e-waste. Novel bio-based recycling tools are efficient and environmentally friendly additions for the generation of a sustainable circular economy.

In our team, we develop such peptide-based recycling tools and processes. We apply phage surface display as a key technology for the identification of novel artificial peptides that selectively interact with minerals, metal ions and polymer surfaces. These peptides are applied for the functionalization of magnetic particles to selectively separate target particles such as individual Rare Earth Elements that are part of fluorescent lamp powder and that are currently not recyclable. Filter-immobilized biomolecules are efficient and reusable tools for the recovery of ions such as Gallium from industrial wastewater. The application of arsenic-binding peptides identified by our team was just recently shown for the flotation of arsenic minerals.

In recent efforts, we seek to extend our discoveries and methods to an accessible knowledge platform. By providing best-practice recommendations for experimental approaches as well as bioinformatic tools for the identification of highly specific inorganic binding peptides as well as their technical utilization, we aim to provide an easily accessible biomolecular toolbox for resource recovery.

With our research, we want to prove that biological recycling strategies are combinable with efficiently working traditional recycling steps to increase the number of extracted elements, decrease the environmental impact of toxic extraction agents as well as decrease the amount of waste.

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