

 **MINI-SYMPOSIUM: MATERIALS FOR THE DIGITAL ENVIRONMENT**

Talk 5 – Wednesday, June 24, 2020, 5 p.m.

**HIGHLY MINIATURIZED SOFT, WIRELESS AND BATTERY-FREE BIO INTERFACES**

Prof. Dr. Philipp Gutruf  
The University of Arizona, Tucson, AZ, USA

Recent advances in materials and fabrication concepts for the creation of soft electronics coupled with miniaturization of wireless energy harvesting schemes enable the construction of high-performance electronic and optoelectronic systems with sizes, shapes and physical properties matched to biological systems. Applications range from continuous monitors for health diagnosis to minimally invasive exploratory tools for neuroscience.

This talk introduces science and engineering aspects for the creation of soft devices with near field power transfer and data communication capabilities and discusses application in imperceptible body-worn devices for the assessment of hemodynamics, sweat and thermal properties of the skin.

Following advances in resonant power transfer opportunities for highly miniaturized embodiments arise and result in devices that can be deployed as subdermal neuroscience tools for wireless recording and stimulation of genetically targeted cell populations. These highly miniaturized systems enable untethered, operation for behavioral studies that eliminate motion constraints and enable new experimental paradigms in a range of complex 3D environments and contexts that cannot be explored with conventional technologies. We extend this concept to devices with capabilities in multimodal stimulation of the brain and the peripherals resulting in a broad suite of modulation and recording tools for the nervous system and major organs such as the heart.

In conclusion the talk introduces highly miniaturized wireless battery free sensors and stimulators that match mechanical and physical properties of biological systems to deliver clinical grade data streams and unparalleled stimulation capabilities that surpass performance of contemporary rigid systems through highly intimate contact.

**KONTAKT**

INM – Leibniz-Institut  
für Neue Materialien gGmbH  
Campus D2 2  
66123 Saarbrücken  
[www.leibniz-inm.de](http://www.leibniz-inm.de)

Christine Hartmann  
Event Manager  
[christine.hartmann@leibniz-inm.de](mailto:christine.hartmann@leibniz-inm.de)  
Tel: 0681-9300-244  
Fax: 0681-9300-233