TOHOKU UNIVERSITY

The 8th FRIS-TFC Collaboration Event

Interdisciplinary seminar on advanced bioelectronics at the interface of engineering and life sciences

工学・生命科学融合セミナー：先端バイオエレクトロニクスの展望

2025. 10. 20

10:00 – 11:30 Mon.

会場　片平キャンパス 知の館

講演者：

10:00–10:50（45 分＋質疑応答 5 分）

Sven Ingebrandt

（RWTH Aachen University教授/
Institute of Materials in Electrical Engineering 1 (IWE1) 所長）

Prof. Dr. Sven Ingebrandt is leading the research group Micro-Nanosystems and Bioelectronics working at the interface between biotechnology, cell biology, nanotechnology, electronics and microsystem technology. His main interests are NEMs and MEMs design and fabrication for biological, bioelectronics, environmental and industry 4.0 sensing applications with a focus on novel, functional materials, bioelectronic signal recording and interpretation, neuronal implants and system integration of NEMs and MEMs for their various technical applications.

Material and Scaling Aspects for Biosensors and Cell-Device Interfacing with Micro- and Nanoelectronic Devices

Engineered materials and their special properties in the nanoscale regime play a pivotal role for biosensor and bioelectronic applications. Four examples will be discussed: First, materials and devices for the in vitro monitoring of cells and tissue. There, classical materials such as metals and semiconductors and conductive polymers in organic electrochemically gated transistors will be compared. Second, we will show examples for the in vitro monitoring of cells and for detection of ions in sweat. Third, ultrathin 2D materials are highly beneficial for biosensing platforms to detect small biomolecules. Finally, for long-term neuro stimulation purposes, conductive polymers and 2D materials might not be the best choice of material due to stability issues and the generation of reactive oxide species. There classical electrode materials such as iridium oxide are beneficial.
In conclusion, different classes of materials are utilized in modern biomedical monitoring devices, but there is no “one fit all” solution.

10:50–11:15（20 分＋質疑応答 5 分）

山本 英明 准教授（東北大学電気通信研究所）

Bioengineering platforms for constructing and probing neuronal computations

11:15–11:28（10 分＋質疑応答 3 分）

Etienne Le Bourdonnec 氏

（東北大学医工学研究科）

Development of a magnetic μCoil fiber for minimally invasive and high-precise neuromodulation

FRIS　Tohoku Forum for Creativity

主催：学際科学フロンティア研究所
共催：知の創出センター
後援：医工学研究科
共同プロジェクト研究(T)情報バイオトロニクス研究会