

# Body-Interfaced Biosensors

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## Abstract

The rise of personalized medicine is reshaping traditional healthcare, enabling predictive analytics and tailored treatment strategies. In this talk, I will discuss our progress in developing wearable, implantable, and ingestible electrochemical biosensors for real-time molecular analysis. These bioelectronic systems autonomously access and sample diverse body fluids—including sweat, interstitial fluid, gastrointestinal fluid, wound exudate, and exhaled breath condensate—enabling continuous monitoring of key biomarkers such as metabolites, nutrients, hormones, proteins, and drugs during various activities. To facilitate scalable, cost-effective manufacturing of these high-performance, nanomaterial-based sensors, we employ laser engraving, inkjet printing, and 3D printing techniques. The clinical utility of our biosensors is being evaluated in human and animal studies, focusing on applications such as stress and mental health assessment, precision nutrition, chronic disease management, and personalized drug monitoring. Additionally, I will highlight our efforts in energy harvesting from both the body and the environment, opening the door to battery-free, wireless biosensing technologies. By integrating electrochemical biosensing with advanced bioelectronics, we aim to revolutionize personalized healthcare, offering new possibilities for diagnostics, continuous monitoring, and therapeutic interventions.

## Keywords

Flexible, sensor, printing