

DISPOSABLE SENSORS FOR NEXT-GENERATION ON-SITE TESTING MATERIALS

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Host: Prof. Dr. Aránzazu del Campo

Disposable sensors are low-cost and easy-to-handle sensing devices for short-term or single-shot measurements. In recent years, they have become increasingly important for various applications which includes from environmental, forensic, pharmaceutical, agricultural, and food monitoring to diagnostics, especially the point-of-care testing and wearables. In this talk, first a short introduction to disposable sensors will be given. Afterwards, a broad spectrum of different biosensing approaches for next-generation on-site testing will be presented: (i) A CRISPR-powered electrochemical biosensor for nucleic-acid-amplification-free, simultaneous and on-site detection of different RNAs for COVID-19 management, (ii) multiplexed on-site therapeutic drug monitoring of antibiotics from invasive and non-invasive samples toward personalized antibiotherapy, (iii) low-cost electrochemical paper-based wearable sensors that can be integrated to any type of facemask for wearable and continuous monitoring of breath biochemistry and/or testing of the infectious diseases such as corona viruses from exhaled breath, (iv) light-controlled dynamic bioassays using optogenetic switches (OptoAssays) for wash- and pump-free point-of-care diagnostics, and (v) wearable microfluidic immunosensing devices for lab-on-a-bird applications.

Bio

Dr. Can Dincer is currently the head of the junior research group "Disposable Microsystems" at the FIT Freiburg Center for Interactive Materials and Bioinspired Technologies and at the Department of Microsystems Engineering (IMTEK) of the University of Freiburg. The main research interest of his working group is the development of bioanalytical materials/sensors/microsystems and their combination with data science and artificial intelligence for various applications including diagnostics, especially for point-of-care diagnostics and wearables, food and environmental monitoring.

Having completed his studies in microsystems engineering, Dr. Dincer graduated from the Technical Faculty of the University of Freiburg. He received his PhD degree with summa cum laude in 2016 through his work on the topic "Electrochemical microfluidic multiplexed biosensor platform for point-of-care testing". In early 2017, he has been awarded by the second place in Gips-Schüle Young Scientist Award for his dissertation. Between June 2017 – June 2019, Dr. Dincer also worked as a visiting researcher at the Department of Bioengineering at the Imperial College London. During this time, his focus was on the paper-based analytical devices and their different applications. In September 2019, he joined the editorial team of the journal "Biosensors and Bioelectronics" as an Associate Editor.

In late 2019, Dr. Dincer received the Adolf Martens Prize in the category "Analytical Chemistry" for his research on the optimization of electrochemical biosensors for the point-of-care diagnostics. In September 2020, he has been awarded with the Best Paper Award 2020 of iba Heiligenstadt for his publication "CRISPR/Cas13a powered electrochemical microfluidic biosensor for nucleic acid amplification-free miRNA diagnostics" in the journal "Advanced Materials". Besides, in 2020 Dr. Dincer is also recognized within 25 early-stage investigators advancing the field of sensor science in the Special Issue "Rising Stars in Sensing" of the journal "ACS Sensors". In July 2021, he has received the Biosensors & Bioelectronics Best Paper Award for his publication on "CRISPR-powered electrochemical microfluidic multiplexed biosensor for target amplification-free miRNA diagnostics".

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