



Department of
Biomedical Engineering

香港城市大學
City University of Hong Kong

Skin-Interfaced Wearable Biosensors

Dr. Wei Gao

Assistant Professor

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Venue: LI-2505, 2/F

Li Dak Sum Yip Yio Chin Academic Building



Abstract

The rising research interest in personalized medicine promises to revolutionize traditional medical practices. This presents a tremendous opportunity for developing wearable devices toward predictive analytics and treatment. In this talk, I will introduce our efforts in developing wearable biosensors for non-invasive molecular analysis. Such wearables can autonomously access body fluids (e.g., human sweat) across the activities and continuously measure a broad spectrum of analytes including metabolites, nutrients, hormones, proteins, and drugs. To manufacture these high-performance nanomaterial-based wearable biosensors at a large scale and minimal cost, we employ techniques such as laser engraving, inkjet printing, and 3D printing. The clinical utility of our wearable systems is assessed through a series of human trials, focusing on precision nutrition, stress and mental health evaluation, chronic disease management, fertility management, and drug personalization. I will also delve into our ongoing research into energy harvesting from both the human body and the surrounding environment, with the aim of achieving battery-free, wireless wearable biosensing. The integration of these wearable technologies has the potential to unlock a wide spectrum of applications, ranging from personalized monitoring and diagnostics to innovative therapeutic solutions.

Biography

Wei Gao is an Assistant Professor of Medical Engineering, Ronald and JoAnne Willens Scholar, and Heritage Medical Research Institute Investigator at the California Institute of Technology. He earned his Ph.D. in Chemical Engineering from the University of California, San Diego in 2014, followed by a postdoctoral fellowship in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley from 2014 to 2017.

He is serving as an Associate Editor for Science Advances, npj Flexible Electronics, Biosensors and Bioelectronics, and Sensors & Diagnostics. His achievements have garnered a number of awards and honors, such as Winner of Falling Walls Breakthrough of the Year 2023 in Engineering and Technology, NSF Career Award, ONR Young Investigator Award, IAMBE Early Career Award, Sloan Research Fellowship, Pittsburgh Conference Achievement Award, IEEE EMBS Early Career Achievement Award, IEEE Sensor Council Technical Achievement Award, 3M Non-Tenured Faculty Award, MIT Technology Review 35 Innovators Under 35, ACS DIC Young Investigator Award, and Materials Today Rising Star Award. He is also recognized as a World Economic Forum Young Scientist, a Highly Cited Researcher (Web of Science), and is a member of the Global Young Academy. His research interests encompass a wide range of areas including wearable sensors, bioelectronics, flexible electronics, and micro/nanorobotics.

For additional information about Gao's research, please visit www.gao.caltech.edu.