

“Wearable Electrochemical Sensors: Toward Labs on the Skin or in the Mouth”

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Dr. Wang is Distinguished Professor, SAIC Endowed Chair and Chair in Department of Nanoengineering at University of California, San Diego (UCSD). He is also the Director of the UCSD Center of Wearable Sensors. He served as the director of Center for Bioelectronics and Biosensors of Arizona State University (ASU) before joining UCSD. Prof. Wang has published more than 1050 papers, 11 books and he holds 25 patents (H Index=150, >95,000 citations). He received 2 American Chemical Society National Awards in 1999 (Instrumentation) and 2006 (Electrochemistry) and 4 Honorary Professors from Spain, Argentina, Czech Republic, Romania, China and Slovenia. Prof. Wang is the Editor-in-Chief of *Electroanalysis* (Wiley). His scientific interests are concentrated in the areas of bioelectronics, biosensors, bionanotechnology, nanomachines, and electroanalytical chemistry.



ABSTRACT

Wearable sensors have received major recent attention due to their considerable promise for monitoring the wearer's health and wellness [1,2]. The medical interest for wearable systems arises from the need for monitoring patients over long periods of time. These devices have the potential to continuously collect vital health information from a person's body and provide this information to them or their healthcare provider in a timely fashion. Such sensing platforms provide new avenues to continuously and non-invasively monitor individuals and can thus tender crucial real-time information regarding a wearer's health. This presentation will discuss recent developments in the field of wearable electrochemical sensors integrated directly on the epidermis or within the mouth for various non-invasive biomedical monitoring applications [3-6]. Particular attention will be given to non-invasive monitoring of metabolites and electrolytes using flexible amperometric and potentiometric sensors, respectively, along with related materials and integration considerations. The preparation and characterization of such wearable electrochemical sensors will be described, along with their current status and future prospects and challenges.

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2. A. J. Bandodkar and J. Wang, "Non-invasive wearable electrochemical sensors: a review", *Trends Biotechnol.*, 2014, 32, 363.
3. "Wearable Sensors: Modalities, Challenges, and Prospects", J. Heikenfeld, A. Jajack, J. Rogers, P. Gutruf, L. Tian, T. Pan, R. Li, M. Khine, J. Kim, J. Wang, J. Kim, *Lab Chip*. 2018, 18, 217.
4. "Wearable salivary uric acid mouthguard biosensor with integrated wireless electronics", J. Kim, S. Imani, W. R. de Araujo, J. Warchall, G. Valdes-Ramirez, T. R. L. C. Paixao, P. Mercier, J. Wang, *Biosensors Bioelectronics*, 2015, 74, 1061.
5. A. Bandodkar, V. Hung, W. Jia, G. Valdes-Ramirez, J. Ramirez, A. Martinez, J. Windmiller, K. Kerman, J. Wang, "Tattoo-based Potentiometric Ion-Selective Sensors for Epidermal pH Monitoring", *Analyst*, 2013, 138, 123.
6. W. Jia, A. J. Bandodkar, G. Valdes-Ramirez, J. R. Windmiller, Z. Yang, J. Ramirez, J. Garrett, J. Wang, "Electrochemical Tattoo Biosensors for Real-time Non-Invasive Lactate Monitoring in Human Perspiration", *Anal. Chem.*, 2013, 85, 6653.

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