

# From Lab to Life – Skin-Integrated Wireless Technologies for Health Monitoring at Scale



## John A. Rogers

Director of Querrey/Simpson  
Institute for Bioelectronics  
**Northwestern University**  
[jrogers@northwestern.edu](mailto:jrogers@northwestern.edu)

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### ABSTRACT

The skin is mechanically soft and curved; modern electronic and microfluidic technologies are rigid and planar. Eliminating this profound mismatch in physical properties will create vast opportunities in man-made systems that can naturally integrate onto the epidermis, for diagnostic, therapeutic or sensory function with important, unique capabilities relevant to fitness/wellness and clinical healthcare. Over the last decade, a convergence of new concepts in materials science, chemical engineering, electrical engineering and advanced manufacturing has led to the emergence of diverse, novel classes of 'biocompatible' electronic and microfluidic systems with skin-like physical properties. This talk describes the key ideas and presents some of the most recent device examples, including (1) wireless, battery-free electronic 'tattoos', with applications in continuous monitoring of vital signs in maternal, neonatal and pediatric populations, including active deployments in the most advanced hospitals in the US and clinics in multiple countries in Africa, (2) microfluidic platforms that can capture, manipulate and perform biomarker analysis on microliter volumes of sweat, with applications in cystic fibrosis screening, pharmaceutical dosing and nutritional monitoring.

**Contact: Prof. Tae-il Kim**  
[taeilkim@skku.edu](mailto:taeilkim@skku.edu)

