Materials Chemistry Seminar

Friday, February 23, 2024
11:30 a.m. ~ BRWN 4102

"Wearable Biomedical Devices for Human Healthcare"

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Abstract:

My laboratory at Purdue University focuses on bridging the critical gap between engineering and unmet clinical needs through the innovation of wearable technologies. Our scholarly efforts are dedicated to addressing this gap using novel yet simple flexible micro-transducers with a clear path towards translation into measurable clinical impacts. We explore a wide variety of wearable biomedical devices that are safely attachable to the skin or eye, enabling continuous remote assessment of human health and chronic diseases. The potential applications of these devices are far-reaching, from healthcare to rehabilitation and telemedicine. In this talk, I will discuss: (1) Sticktronics - sticker-like thin film electronics that are flexibly attachable to the curved surfaces of arbitrary places, increasing the range of industrial and healthcare applications; (2) sensory skin patches that are tailored for various clinical needs of particular urgency in the telemedicine field; (3) smart contact lenses that are built on various commercial brands of soft contact lenses, which could be used to continuously monitor chronic ocular diseases such as glaucoma; and (4) injectable silicon nanoneedles that are built on flexible, biodegradable patches for painless and long-term sustained ocular drug delivery. I will present the results of detailed experimental and theoretical studies to provide insights into each of these topics. At my seminar for the Westwood (President’s house) Lecture Series on January 25th 2023, I discussed some of the key aspects of these topics for those who were present.

Referenced Articles:
https://doi.org/10.1038/s41467-022-33254-4
https://www.science.org/doi/10.1126/sciadv.adk4295