ABSTRACT:

Crack-Driven Transfer Printing for Flexible Electronics

Chi Hwan Lee, PhD, Fellow of AIMBE

University Faculty Scholar
Leslie A. Geddes Professor of Biomedical Engineering and Professor of Mechanical Engineering, and by Courtesy of Materials Engineering, Electrical and Computer Engineering, and Speech, Language, & Hearing Sciences at Purdue University
Adjunct Professor of Optometry at Indiana University
206 S. Martin Jischke Dr., West Lafayette, IN

Email: lee2270@purdue.edu | Tel: 765-494-6212 | https://engineering.purdue.edu/StickTronics/

My laboratory at Purdue University focuses on bridging the gap between engineering and unmet clinical needs through innovations in wearable technologies. Central to this effort is our crack-driven transfer printing strategy, which enables high-yield, scalable assembly of flexible micro-transducers onto soft, curved, or biologically relevant surfaces. This simple yet powerful fabrication platform provides a clear translational pathway for developing wearable biomedical devices for continuous, remote monitoring of health and chronic diseases. In this talk, I will highlight how crack-driven transfer printing accelerates the development of several clinically motivated systems: (1) StickTronics—sticker-like thin-film electronics conformally attachable to a wide range of curved surfaces for industrial and healthcare applications; (2) sensory skin patches designed for urgent telemedicine needs; (3) smart contact lenses, built on commercial soft lenses, for continuous monitoring of chronic ocular diseases such as glaucoma; and (4) flexible, biodegradable patches embedded with injectable silicon nanoneedles for painless, sustained ocular drug delivery. I will share both experimental and theoretical insights into how crack-driven transfer printing enables these platforms and expands the design space for next-generation flexible electronics.