



Wolfson Department of Chemical Engineering Seminar

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ZOOM: <https://gtiit.zoom.us/j/2390785016?omn=92839680221>

Permeable Electronic Skins for Personalized Healthcare

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PhD Final Seminar

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Wearable electronic skins have emerged as promising platforms for continuous physiological monitoring, offering new opportunities for early disease diagnosis and personalized healthcare. However, the practical deployment of epidermal bioelectronics remains challenged by limited breathability, poor environmental adaptability, and insufficient long-term operational stability, which often compromise signal quality and user comfort during prolonged use.

In this seminar, I will present our recent advances in the development of permeable electronic skins for long-term, high-fidelity electrophysiological monitoring. First, an ultrathin gas-permeable organohydrogel electrode reinforced by a polyurethane nanomesh is introduced. By incorporating deep eutectic solvents into the hydrogel network, the device achieves excellent anti-freezing and anti-drying performance, strong skin adhesion, high vapor permeability, and robust mechanical durability, enabling reliable biosignal acquisition under diverse environmental conditions.

Second, I will present a highly stretchable and recyclable liquid metal-iron fiber conductor for wearable bioelectronics. The conductor combines high electrical conductivity, exceptional stretchability, excellent permeability, and long-term electromechanical stability, while offering a sustainable route for material recycling and device fabrication.

Together, these material and device innovations establish a versatile platform for breathable, skin-conformal, and durable bioelectronics. This work highlights the potential of permeable electronic skins to enable continuous health monitoring and accelerate the development of next-generation personalized healthcare systems.