

Junior Researcher Mentoring Programme

2023

Code:	JRMP2023_10
School / Department:	Department of Biomedical Engineering
Name of Research Team Member(s):	Dr Thomas Lee, Associate Professor and Associate Head (Academic)
Research Topic:	Wearable Biosensors for Sports Training
Short Description of the Research Project:	<p>This project aims to develop a graphene biosensor on temporary tattoo paper for noninvasive and continuous sweat lactate monitoring during endurance exercise for performance assessment and training program design. Specifically, the exercise intensity at which the sweat lactate concentration starts to increase exponentially is determined (transition from aerobic to anaerobic exercise; above which muscle fatigue occurs).</p> <p>The objectives include:</p> <ol style="list-style-type: none"> (1) develop a better fabrication process for the graphene-temporary tattoo paper laminate, including poly(vinyl alcohol) lamination transfer and direct graphite contact transfer; (2) investigate different enzyme-based electrochemical lactate sensing strategies and carry out in vitro experiments to evaluate the sensor performance, i.e., detectable concentration range, sensitivity, and specificity; and (3) carry out on-skin experiments and validate this new sensing platform, followed by endurance athletes performance assessment and training based on the sweat lactate threshold.

	The participating students will be involved in the experiments for fabricating the graphene–temporary tattoo paper laminate. Depending on the progress and students' schedule, they may have the opportunity to work on experiments related to Objectives 2 and 3.
No. of Places Offered:	4
Frequency of Meetings:	Bi-weekly
Special Requirement(s):	The participating students should take Chemistry as the elective subject.

** The information presented above is subject to change.*