



DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Biomechanical, physiological, and environmental measurements for construction ergonomic risk assessment**Dr Maxwell Fordjour Antwi-Afari**Department of Civil Engineering
Aston University, UK

Date: May 07, 2025 (Wednesday)

Time: 3:30 p.m. to 4:30 p.m.

Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Abstract

The construction industry faces numerous ergonomic challenges, exposing workers to biomechanical, physiological, and environmental risk factors that can lead to developing work-related musculoskeletal disorders (WMSDs). Biomechanical analysis involves assessing body postures, joint movements, and muscle exertions using wearable sensors and computer vision techniques. Physiological measurements, such as heart rate, oxygen consumption, and electromyography (EMG), provide insights into workers' physical exertion and fatigue levels. Environmental factors, including temperature, humidity, and noise levels can significantly influence workers' comfort, strain, and overall safety. Effective ergonomic risk assessment is crucial for mitigating these risk factors and ensuring a safer work environment. Dr Maxwell Fordjour Antwi-Afari will talk about different wearable sensing technologies for capturing biomechanical, physiological, and environmental measurements. In addition, he will present machine/deep learning algorithms for automated recognition and classification of construction ergonomic risks. Lastly, he will demonstrate how future research can integrate digital twins and wearable sensing technologies in construction ergonomic risk assessment.

About the Speaker

Dr Maxwell Fordjour Antwi-Afari is a Lecturer in Construction & QS at the Department of Civil Engineering, Aston University, UK. He is also the Transnational Education Programme Director for BSc Construction Project Management between Aston University and Northeast Forestry University, China. He worked as a Postdoctoral Research Fellow and attained his PhD in Construction Information Technology from the Department of Building and Real Estate, The Hong Kong Polytechnic University. His research interests focus on construction management and engineering, construction health and safety, smart construction informatics (e.g., machine/deep learning networks), construction ergonomics (e.g., stress, physical and mental fatigue), digital technologies and innovations (e.g., building information modelling, wearable sensors, robotics, blockchain, internet of things, digital twin). He has published more than 130 papers over the years in high-ranked peer-reviewed journals and conference proceedings. He serves as a reviewer, external examiner, editorial member, and guest editor for many international journals. Maxwell has received many awards including Commendation Award from The Chartered Institute of Building (CIOB) (Hong Kong) Outstanding Paper Award, Grand Winner of Occupational Safety and Health Best Project Scholarship, and Best Newcomer for Aston Achievement Awards 2021. Maxwell has successfully received several research grants/projects funded by The Royal Society, Digital Futures Institute (DFI), The Hong Kong Polytechnic University, Innovate UK Knowledge Transfer Partnership (KTP), Aston Research and Knowledge Exchange Pump Priming, and Construction Industry Council (CIC) - Hong Kong (HK). He is a *Senior Fellow*, Higher Education Academy, *Member* of the Hong Kong Ergonomics Society (HKES), and *Associate Member*, American Society of Civil Engineers (ASCE).

- ALL ARE WELCOME -