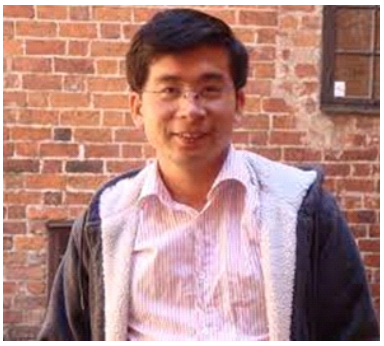
EIER 2022

The 3rd workshop on
Energy, Infrastructure and Environment Research

Sustainability for resilience, and resilience for sustainability

Unmanned Aerial Vehicles-assisted Disaster Emergency Communications

This talk concentrates on using amateur unmanned aerial vehicles (UAV), aka low-cost drones, to aid in disaster relief under hostile conditions such as congested/destroyed network or lack of power supply. UAVs flying above the affected area (to serve as a backbone to connect the disaster area with central control units) could help first responders in assessing the gravity of disaster recovery and relief scenario, such as aftermath of flooding, hurricanes, and earthquakes. However, the challenge associated with UAVs' use is two-fold. As a device, UAVs' airborne duration is limited by their battery capacity, whereas their intensive assistance is required during the first hours of the disaster. Hence, the resource (including power, bandwidth) allocated to each UAV must be well-optimised. Moreover, optimisation of radio resource for UAVs as a network to provide adequate coverage for the disaster area is critical and not without difficulty, since the disaster environment changes rapidly. Traditional wireless communications methods are expensive and extremely time-consuming, failing to address this problem. This remains one of the greatest challenges in communications engineering.



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Prof. Duong Quang Trung is a Chair Professor of Telecommunications at Queen's University Belfast, U.K and a Research Chair of the Royal Academy of Engineering, U.K. His current research interests include wireless communications, signal processing, and machine learning. He has published more than 400 papers with 13 100+ citations and h-index 63. He has served as an Editor for the IEEE Transactions on Wireless Communications, IEEE Transaction on Communications, IEEE Transaction on Vehicular Technology, and Executive Editor for the IEEE Communications Letters. He has received the Best Paper Award at the IEEE Vehicular Technology Conference (VTC-Spring) in 2013, IEEE International Conference on Communications (ICC) 2014, IEEE Global Communications Conference (GLOBECOM) 2016, IEEE Digital Signal Processing Conference (DSP) 2017, and GLOBECOM 2019. He is the recipient of prestigious Royal Academy of Engineering Research Fellowship (2015-2020) and has won a prestigious Newton Prize 2017.