ABSTRACT
In previous earthquake events, it has been reported that a large number of reinforced concrete (RC) frames experienced severe damage, or even collapsed, due to insufficient ductility and energy dissipation capacity. Most of these frames were designed and built according to old codes, in which the gravity loads were considered as the major design loads while the earthquake load was given a lower emphasis. At present, there are still numerous nonductile frames existing in the potential earthquake regions across the world. All of these RC frames have high collapse risk during the future strong earthquakes. In order to mitigate the risk, seismic strengthening of these RC frames before earthquakes is urgently needed. In the past two decades, the use of externally bonded fiber-reinforced polymer (FRP) composites for seismic strengthening RC structures has been received a lot of attention and increased significantly compared with traditional retrofitting methods.

This presentation will provide an experimental and analytical investigation of the seismic performance of nonductile RC frames strengthened with carbon fiber-reinforced polymer (CFRP). The research was conducted on the material level, member level, and structural level, respectively. Firstly, the axial stress-strain behaviour of FRP-confined concrete was investigated as the basic work on material level. Then, the seismic performance of CFRP strengthened RC columns and beam-column joints were studied on the member level. Finally, on the structural level, the seismic performance of CFRP strengthened nonductile RC frames was investigated using shaking table tests and nonlinear analyses.

DR DAI-YU WANG
Harbin Institute of Technology, Harbin, China

Dr. Dai-Yu Wang is a Lecturer in School of Civil Engineering at Harbin Institute of Technology (HIT), Harbin, China. He obtained his PhD degree on Structural Engineering from HIT in 2012. His research is in the general field of civil and structural engineering, and includes particularly the seismic rehabilitation of reinforced concrete (RC) frames using FRP, nonlinear analysis of RC structure, mechanical and seismic performance of precast RC structures including precast shear walls, precast RC frames, and precast underground utility tunnel. He has published about 20 journal and conference papers in the past 5 years.