

**Structural safety under near-fault and/or multiple hazards
(earthquake, wind, flood, fire, etc.) threat, and disaster mitigation
technologies for improving resilience**

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According to the most updated seismic source characteristic model developed in Taiwan SSHAC Level 3 project, we are threatening by the near-fault ground motion of large magnitude crustal earthquake with Mw 8.0 as well as subduction interface earthquake with Mw 9.0. However, until now the empirical Taiwan ground motion data as well as the knowledge of Taiwan ground motion characterization are limited to address this issue. As a result, two research topics are proposed to know our enemy more well:

1. **Conduct ground motion simulation:** In current available empirical ground motion database, the largest magnitude crustal event is Mw 7.6 Chi-Chi earthquake and the largest magnitude subduction interface event is Mw 7.1 331 earthquake. For interface event, the ground motion data within 40 km is limited. The ground motion data simulated by validated approaches and parameters can provide additional information to realize the large magnitude scaling as well as short distance scaling of Taiwan ground motion.

2. **Develop ground motion model:** The ground motion model is a basic tool to quantify the ground motion intensity and uncertainty range under a specific ground motion scenario. In order to capture the near-fault ground motion characteristics accurately, a comprehensive ground motion model describing the source effect (magnitude, style-of-faulting, depth, main/aftershock etc.), the path effect (geometric spreading, anelastic attenuation, hanging-wall effect, directivity effect etc.) and site effect (shallow soil effect, deep soil effect, nonlinear soil effect etc.) simultaneously should be developed by using appropriate regression method. The ground motion simulation data can help model developer to constrain the extrapolation behavior of ground motion model outside the empirical data range.