Raman tag-enhanced coherent Raman scattering microscopy for super-resolution imaging of live cells

PIs: Zhiwei Huang (NUS) & Jian Ye (SJTU)

Coherent Raman scattering (CRS) microscopy has emerged as a powerful spectroscopic imaging tool in biological and biomedical systems, but its spatial resolution and sensitivity are still limited. This project aims to develop a unique super-resolution cum with super-sensitive CRS technique by incorporating gap-enhanced Raman tags (GERTs, *Nature Communications, 2019, 10, 3905*) into higher-order CRS microscopy (*Nature Photonics, 2019*) for rapid monitoring of dynamics of mitochondria networking in live cells at the molecule level. Such an observation of mitochondrial functioning processes in living cells with extremely high-resolution GERT-CRS imaging in a quantitative manner would provide new insights into the pool of knowledge in cell biology that is unprecedented using fluorescence imaging. We anticipate that the GERT-CRS microscopy developed has great promise to realize super-resolution, super-sensitive imaging for *in vivo* biological systems at the single molecule level with high image contrast.