



**Supplementary Figure 1.** The evaluation of batch effect before and after normalization in the discover dataset. The batch effect before and after Combat function normalization was assessed by Guided Principal Components Analysis package for discover dataset. The variance among batches was statistically assessed with  $p$ -value before (A) and after (B) Combat normalization for discover dataset. Meanwhile, the first two principle components (PC) of each batch were also compared before (C) and after (D) Combat normalization.