

Description of Additional Supplementary Files

Supplementary Data 1: Expression values of normalized Transcript per Million (TPM) of 197 dysfunction-associated TFs in activated and exhausted T cells from previously published transcriptomic datasets combined (tab TPM_TFs_exh_cond) and individually (tabs DICE, JUNE, LIBLAU and WHERRY). Data used to create the heatmaps of Supplementary Figures 1 and 2A-B.

Supplementary Data 2: General SP Library Structure and Supplementary Tables 1-4. Subsection A) shows the General structure of SP containing plasmids with Supplementary Table 1 listing the Library of SP sensor plasmids used in this study, their TF Target, TFBS repetitions, minimal Promoter and GOI. Subsection B) shows the General structure of other plasmids containing SPs cloned using MTK with Supplementary Table 2 listing respective Library of SPs also used in this study, their TF Target, TFBS repetitions, minimal Promoter and GOI. Subsection C) shows a brief description of Transcription Factor plasmids used in this study with Supplementary Table 3 listing the respective plasmids, source and UniProt IDs. Subsection D) shows other plasmids used in this study with associate list provided in Supplementary Table 4.

Supplementary Data 3: Supplementary Table 5 listing the Transcription Factors Binding Sites (TF-BS) used for the SP sensors in this study, including the TF Target, TF-BS names, sequences and Reference/Repository Databank.

Supplementary Data 4: Supplementary Table 6 listing the sequences of minimal promoters (minP), promoters and GOI modules used in this study.