



**Figure S9: Protein disorder analysis**

Distributions of disorder scores for all 3-mers, 4-mers, and FIRE-pro motifs. Disordered regions of the *S. cerevisiae* proteome were determined by DisEMBL, putative instances of motifs or k-mers were identified, and the disorder score was defined as the percentage of motif instances across the entire proteome that lie in disordered regions. FIRE-pro motifs are found more frequently in regions of protein disorder than all 3-mers or 4-mers (Kolmogorov-Smirnov test:  $p < 1e-175$ ; FIRE-pro motifs:  $N=6,862$ ; 3-mers:  $N=8,000$ ; 4-mers:  $N=118,908$ ).