

$$NF_j = \sum_{k \in \mathcal{P}_j} |\beta_k \times \bar{F}_k|$$

$NF_j$  Net Favorability for antibody residue  $j$   
(per-residue importance at the interface)

$\mathcal{P}_j$  Set of all robust antigen–antibody contact pairs involving residue  $j$  (selected in >50% of CV folds)

$\beta_k$  Elastic net coefficient for contact pair  $k$

$\bar{F}_k$  Mean contact frequency for pair  $k$   
(averaged across all replicas and frames)

*Higher NF = more important at the binding interface | 26 antibody interface residues identified*