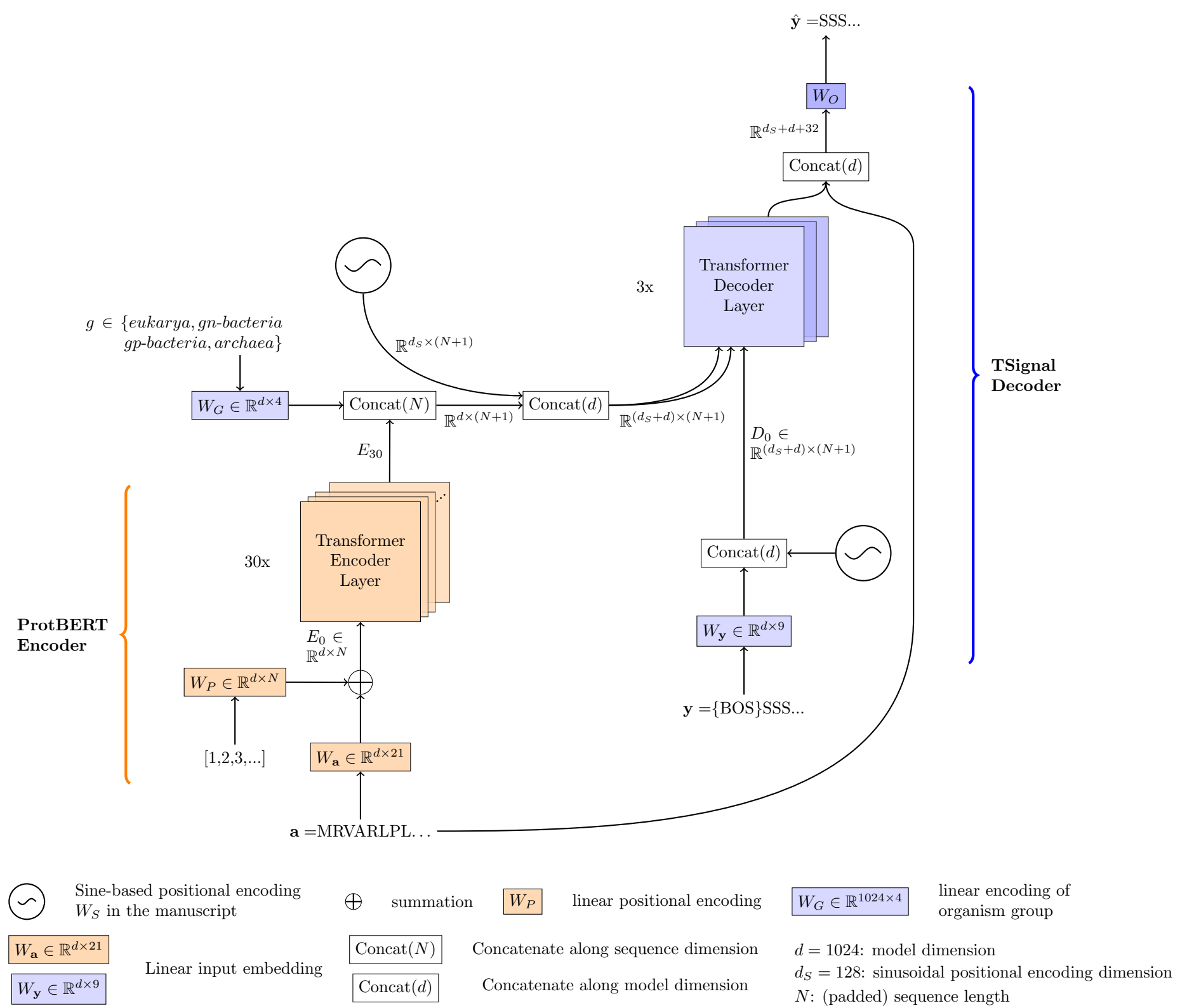
$\hat{\mathbf{y}}$ =SSS...
W_O
$\mathbb{R}^{d_S+d+32}$
Concat(d)
Transformer Decoder Layer
3x
$g \in \{eukarya, gn\text{-}bacteria, gp\text{-}bacteria, archaea\}$
$\mathbb{R}^{d_S\times(N+1)}$
$W_G \in \mathbb{R}^{d\times 4}$
Concat(N)
$\mathbb{R}^{d\times(N+1)}$
Concat(d)
$\mathbb{R}^{(d_S+d)\times(N+1)}$
$D_0 \in \mathbb{R}^{(d_S+d)\times(N+1)}$
TSignal Decoder
E_{30}
Transformer Encoder Layer
30x
Concat(d)
$W_{\mathbf{y}} \in \mathbb{R}^{d\times 9}$
$E_0 \in \mathbb{R}^{d\times N}$
ProtBERT Encoder
$W_P \in \mathbb{R}^{d\times N}$
$\mathbf{y}$ ={BOS}SSS...
[1,2,3,...]
$W_{\mathbf{a}} \in \mathbb{R}^{d\times 21}$
$\mathbf{a}$ =MRVARLPL...
Sine-based positional encoding W_S in the manuscript
summation
W_P
linear positional encoding
$W_G \in \mathbb{R}^{1024\times 4}$
linear encoding of organism group
$W_{\mathbf{a}} \in \mathbb{R}^{d\times 21}$
$W_{\mathbf{y}} \in \mathbb{R}^{d\times 9}$
Linear input embedding
Concat(N)
Concatenate along sequence dimension
Concat(d)
Concatenate along model dimension
$d = 1024$: model dimension
$d_S = 128$: sinusoidal positional encoding dimension
N: (padded) sequence length