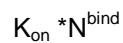
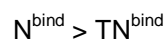


Additional Information

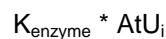
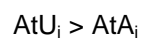
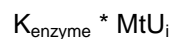
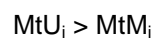
S3. List of model reactions

The following characters are used: M, U, A, and n for methylated, unmodified, acetylated, and 'any' nucleosome state. Subscripts i and j are any location on the array, $i\pm 1$ is the left or right neighbor nucleosome however this is restricted between 1 and N total array length. Thus reactions across the model boundary do not exist. Superscript 'bind' and 'loop' represent a nucleosome on the binding/initiation sites and interaction sites respectively. Mt, At, and T represent methyltransferase, acetyltransferase, and either transferase, when T is placed between brackets the reaction is independent of transferase presence.

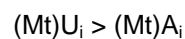
Initiation:



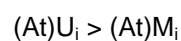
Enzyme modification:



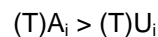
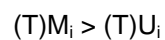
If either enzyme is not explicitly modeled the modification reactions are



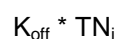
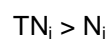
Or



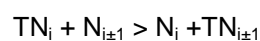
Demodification:



Release:



Sliding:



Recruitment:

$$M_i > MtM_i$$

$$K_{\text{recruit}} * M_i$$

$$A_i > AtA_i$$

$$K_{\text{recruit}} * A_i$$

Enzyme Neighbor modification:

$$MtN_i + (T)U_{i\pm 1} > MtN_i + (T)M_{i\pm 1}$$

$$AtN_i + (T)U_{i\pm 1} > AtN_i + (T)A_{i\pm 1}$$

$$K_{\text{neighbor-modification}} * TN_i + (T)U_{i\pm 1}$$

Looping:

$$N_i^{\text{loop}} + TN_j^{\text{loop}} > TN_i^{\text{loop}} + N_j^{\text{loop}}$$

$$TN_i^{\text{loop}} + N_j^{\text{loop}} > N_i^{\text{loop}} + TN_j^{\text{loop}}$$

$$AtN_i^{\text{loop}} + MtN_j^{\text{loop}} > MtN_i^{\text{loop}} + AtN_j^{\text{loop}}$$

$$TN_i^{\text{loop}} + TN_j^{\text{loop}} > TN_i^{\text{loop}} + TN_j^{\text{loop}}$$

$$N_i^{\text{loop}} + N_j^{\text{loop}} > N_i^{\text{loop}} + N_j^{\text{loop}}$$

$$K_{\text{loop}} * (T)N_i^{\text{loop}} * (T)N_j^{\text{loop}}$$

Initiation sites were always chosen at nucleosome position 25 for the one-enzyme models and at positions 5 and 45 (for At and Mt respectively) when modeled together. Interaction sites were chosen at equidistant sites from the border and each other.

Number of interaction sites	Interaction site position
1	15, 35
3	12, 25, 38
5	8, 16, 25, 34, 42
10	3, 8, 13, 18, 23, 28, 33, 38, 43, 48