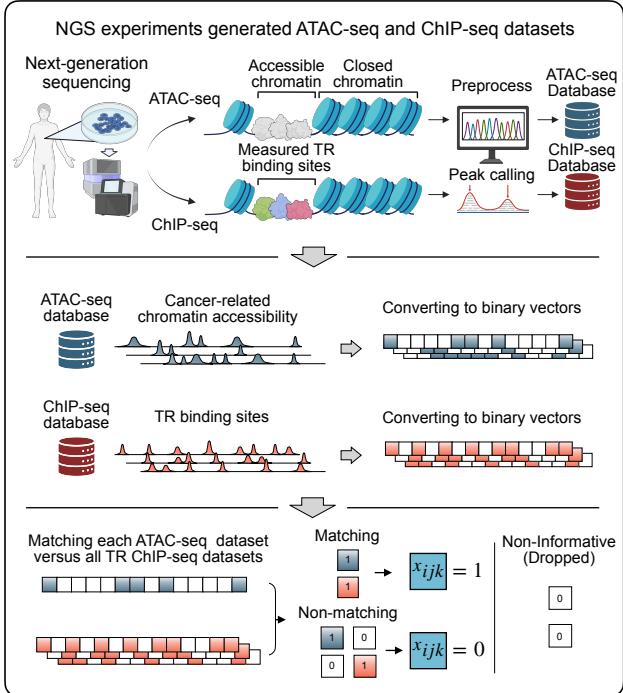
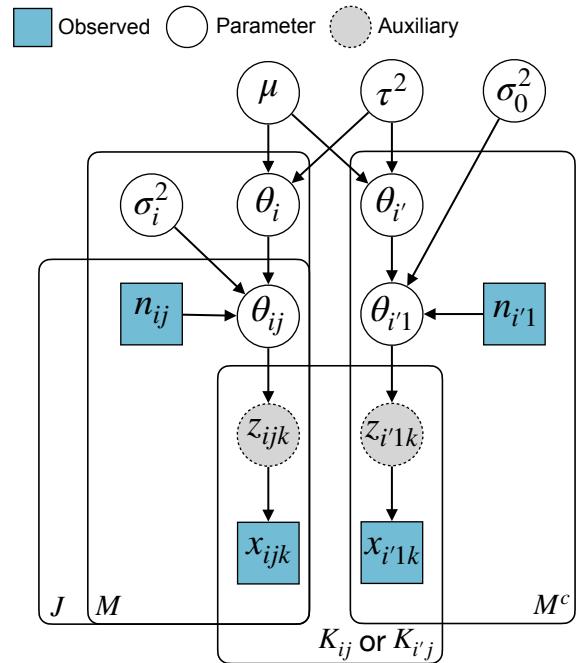


a Data preprocessing and region mapping



b TRex hierarchical model

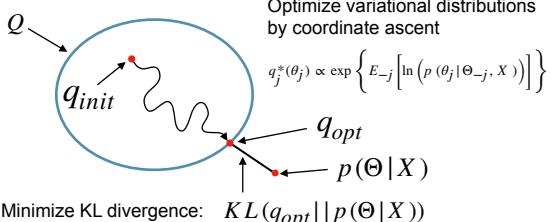


c Mean-field variational inference

Coordinate ascent mean-field variational inference

Mean-field variational family

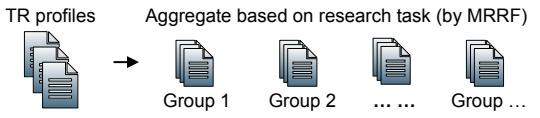
$$q(\Theta) = q(\mu)q(\tau^2)q(\sigma_0^2) \prod_{i=1}^M q(\sigma_i^2) \prod_{i=1}^M q(\theta_i) \prod_{i=1}^{M^c} q(\theta_{i'}) \times \prod_{i=1}^M \prod_{j=1}^{J_i} q(\theta_{ij}) \prod_{i'=1}^{M^c} q(\theta_{i'1}) \prod_{i=1}^M \prod_{j=1}^{J_i} \prod_{k=1}^{K_{ij}} q(z_{ijk}) \prod_{i=1}^{M^c} \prod_{k=1}^{K_{i'1}} q(z_{i'1k})$$



Variational distribution	TR	$\theta_i / \theta_{i'}$	Normal CDF	TRex Score	TR profiles
ESR1		-1.5	$\Phi(\theta_i)$	0.067	
FOXA2		-2.0	$\Phi(\theta_{i'})$	0.023	
AR		-2.3		0.011	
PGR		-2.7		0.003	
...		

d Integration results for TRex online portal

Aggregation of functional TR profiles for downstream analysis



TRex portal for pan-cancer TR profiles and online analysis

