

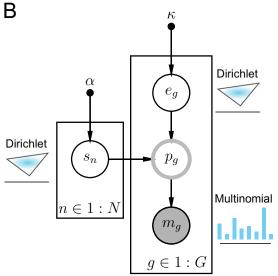
## Generative mutational model

 $e_g \sim \text{Dirichlet}(\kappa)$ 

 $s_n \sim \text{Dirichlet}(\alpha)$ 

 $\theta_{g,i} \sim \text{Categorical}(e_g)$ 

 $m_{g,i} \sim \text{Categorical}(s_n | \theta_{g,i} = n)$ 



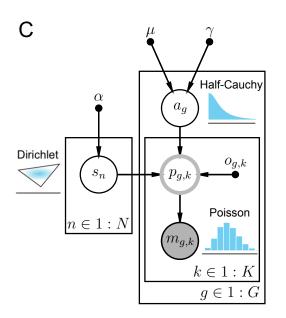
## NMF model

 $e_g \sim \text{Dirichlet}(\kappa)$ 

 $s_n \sim \text{Dirichlet}(\alpha)$ 

$$p_{g,k} = \sum_{n} e_{g,n} \, s_{n,k}$$

 $m_q \sim \text{Multinomial}(p_q|E,S)$ 



## EMu model

 $a_g \sim \text{Half-Cauchy}(\mu, \gamma)$ 

 $s_n \sim \text{Dirichlet}(\alpha)$ 

 $p_{g,k} = o_{g,k} \times \sum_{n} a_{g,n} \, s_{n,k}$ 

 $m_{g,k} \sim \text{Poisson}(p_{g,k}|O,A,S)$ 

Fixed value

Random variable

Observed data

Deterministic value

Dependency

Probability distribution



Poisson

Plate – indicates repeated elements within the model