

$$[\boldsymbol{\alpha}, \sigma \mid \mathbf{y}] \propto \prod_{i=1}^N \prod_{j=1}^M \left[ y_{i,j} \mid g(\boldsymbol{\alpha}, \mathbf{x}), \sigma^2 \right] [\alpha_j] [\sigma]$$

$$g(\boldsymbol{\alpha}, \mathbf{x}) = \alpha_j x_{i,j}$$