

Scaling up Expectation Maximization

$$\max_w p(X \mid w) = \int p(X \mid T, w) p(T) dt$$

Latent Variable model — use EM! But E-step is intractable

MCMC? An option, but we can do better

Then Variational EM! **But again intractable.**

$$\log p(X \mid w) \geq \mathcal{L}(w, q)$$

$$\underset{w, q}{\text{maximize}} \quad \mathcal{L}(w, q)$$

$$\text{subject to} \quad q_i(t_i) = \tilde{q}(t_{i1}) \dots \tilde{q}(t_{im})$$