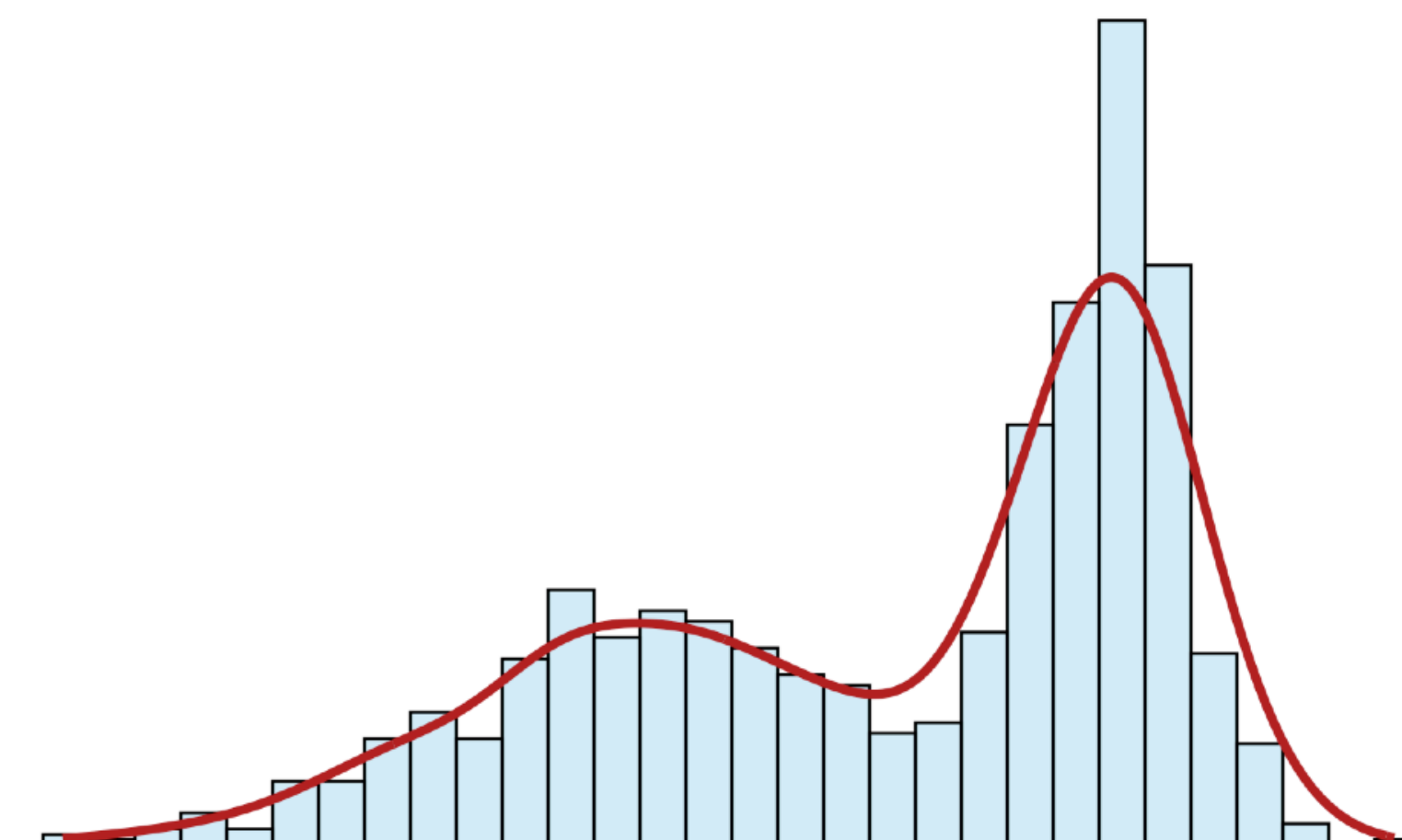# Multimodal Distribution

$$p(x) = \sum_{k=1}^{K} w_k \, \mathcal{N}(x \mid \mu_k, \Sigma_k)$$

probability of being in group k

likelihood of seeing x in group k

Posterior Probabilities

$$p(x) = \quad w_k \, \mathcal{N}(x \,|\, \mu_k, \Sigma_k)$$

prior probability of
being in group k

likelihood of seeing
x in group k

$$p(\text{cluster } k \,|\, x) = \frac{w_k \, \mathcal{N}(x \,|\, \mu_k, \Sigma_k)}{\sum_{j=1}^{K} w_j \, \mathcal{N}(x \,|\, \mu_j, \Sigma_j)}$$

posterior probability
of being in cluster k