Bayesian Neural Networks

$$p(y \mid x, Y_{\text{train}}, X_{\text{train}})$$

$$= \int p(y \mid x, w)\, p(w \mid Y_{\text{train}}, X_{\text{train}})dw$$

$$= \mathbb{E}_{p(w \mid Y_{\text{train}}, X_{\text{train}})} p(y \mid x, w)$$