Training phase - learn parameters θ and W from training data Feature Extraction Multilabel classification Extracted Multilabel classifier Encoder Encoder Decoder $\widetilde{\mathbf{X}}_{tr}$ $\hat{\mathbf{X}}_{tr}$ $\rightarrow h(\widehat{\mathbf{Y}}_{tr} \mid \mathbf{X'}_{tr}; W)$ f_{θ} f_{θ^*} $g_{\theta'}$ Raw Features para unique uniqu \mathbf{Y}_{tr} Corrupted Reconstr. Labels After training the network **Testing phase** - use learned parameters θ^* and W^* to infer protein functions Predictions Multilabel classifier Evaluation $\widehat{\mathbf{Y}}_{ts}$ Encoder $\mathbf{X'}_{ts}$ $B(\mathbf{Y}_{ts}, \widehat{\mathbf{Y}}_{ts})$ $h(\widehat{\mathbf{Y}}_{ts} \mid \mathbf{X'}_{ts}; W^*)$ f_{θ^*} \mathbf{Y}_{ts} Extracted Ground-truth