$$\hat{\theta} = \arg\min_{\theta} \mathbb{E}_{(\tilde{G},\tilde{E},\tilde{P},y)\sim D} \left[\mathcal{L}\left(\hat{f}_{\theta}(\tilde{G},\tilde{E},\tilde{P}), y \right) \right]$$

- $\tilde{G}$ = cellular graph (genome structure with gene networks)
- $\tilde{E}$ = environment (growth conditions, media)
- $\tilde{P}$ = perturbation operator (gene deletions/modifications)