$$\hat{ heta} = rg \min_{ heta} \mathbb{E}_{(ar{G},ar{E},ar{P},y)\sim D} \left[\mathcal{L} \left(\hat{f}_{ heta}(ilde{G}, ilde{E}, ilde{P}),y
ight)
ight]$$

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