

# Meta Learning

Meta-learning is **learning** to learn; the process of *improving* a learning algorithm over multiple learning episodes/tasks.

## *Improve* How?

- Generalization performance
  - Avoid overfitting
- Learning speed
- Adaptability
  - Adapt to new tasks with minimal data or tuning

## Learn What?

- Hyper Parameters / Neural Architecture
- Initial Condition
- Optimizer
  - SGD/Adam? Step size?
- Loss Function
- Minibatch Selection

# Formalizing Meta-Learning

$$\min_{\omega} \mathbb{E}_{\mathcal{T} \sim p(\mathcal{T})} \mathcal{L}_{\text{meta}}(D_{\mathcal{T}}, \omega)$$