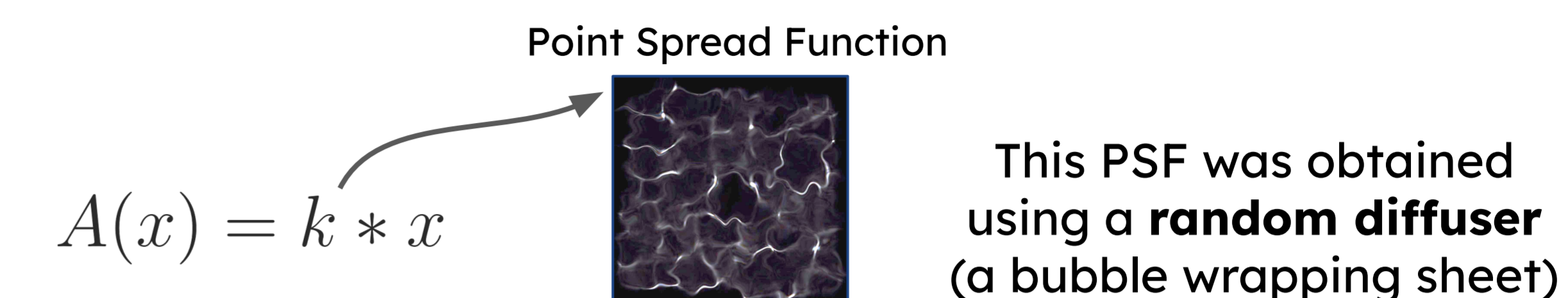
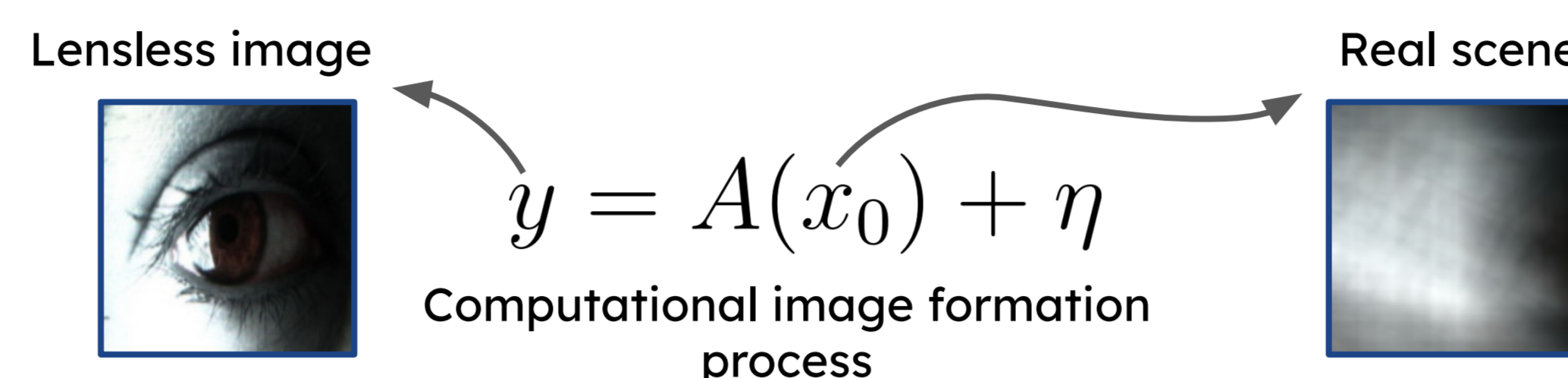
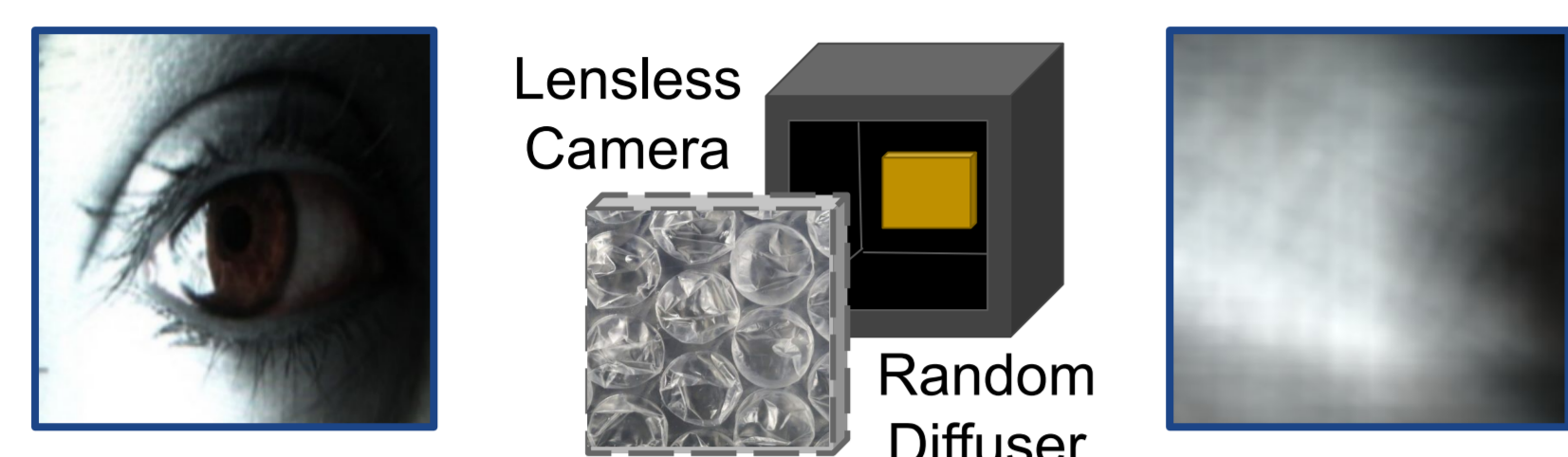


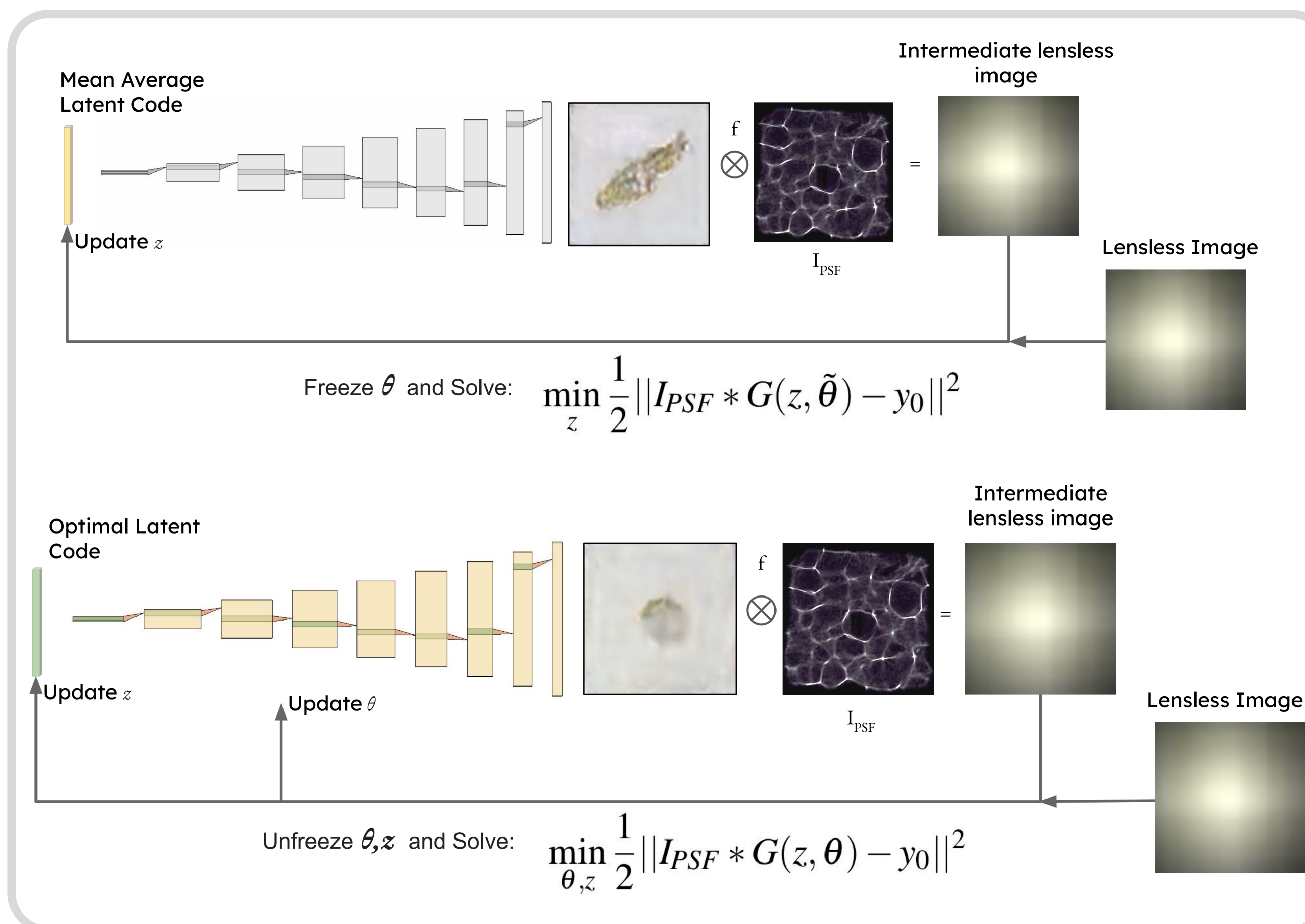
## Fundamentals of Lensless Imaging



## Methodology

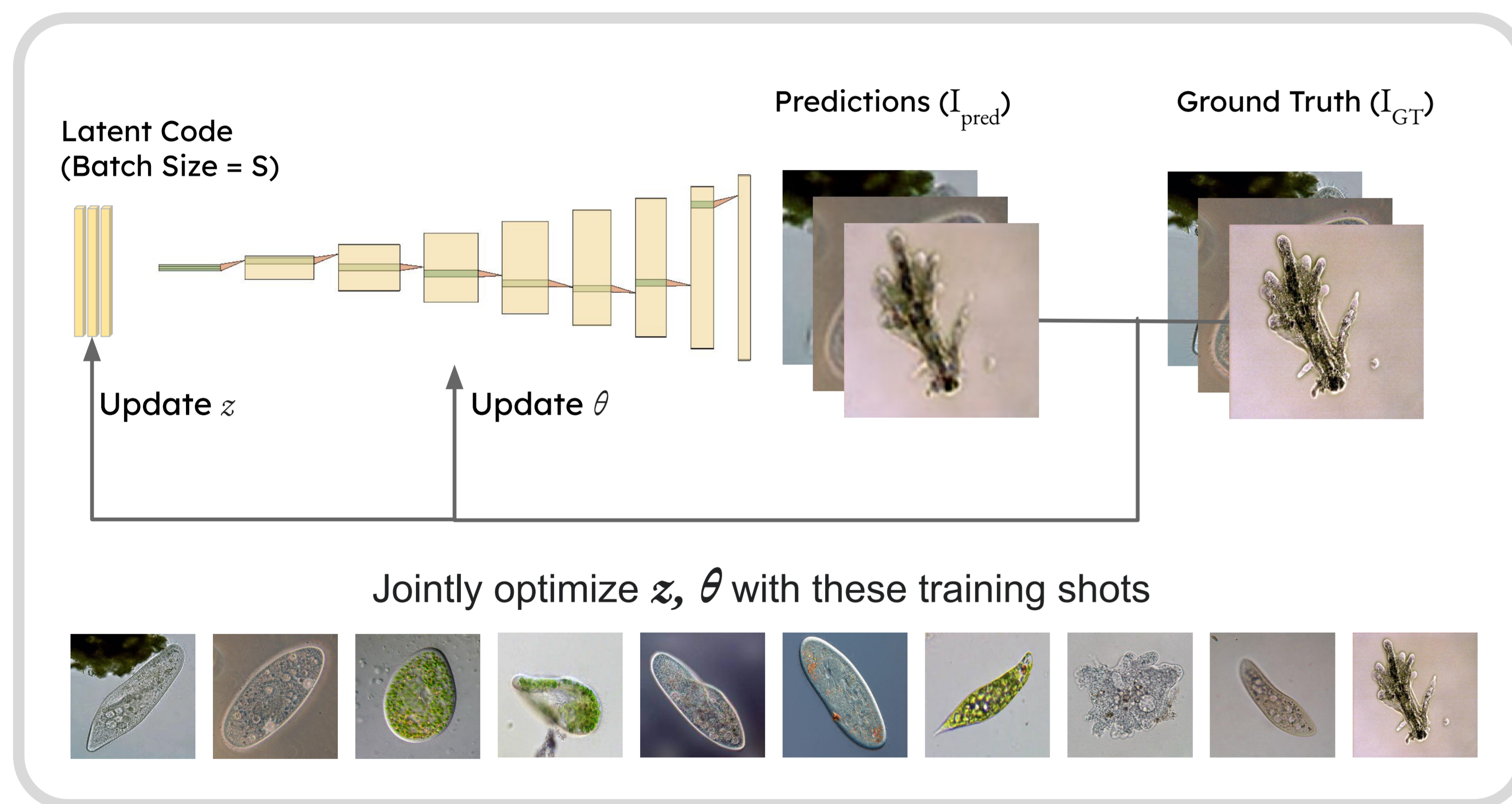
- We propose a decoder-based neural network architecture for lensless image reconstruction in the low-data regime.
- Inspired by [16], we pre-train our network with a few images sharing similar data semantics by jointly optimizing the network parameters and the latent space.
- We solve the inverse problem of lensless image reconstruction by modeling the lensed image as the output of the generator and performing a two-step optimization guided by a physics-informed forward loss function.

### Two-step physics-informed optimization

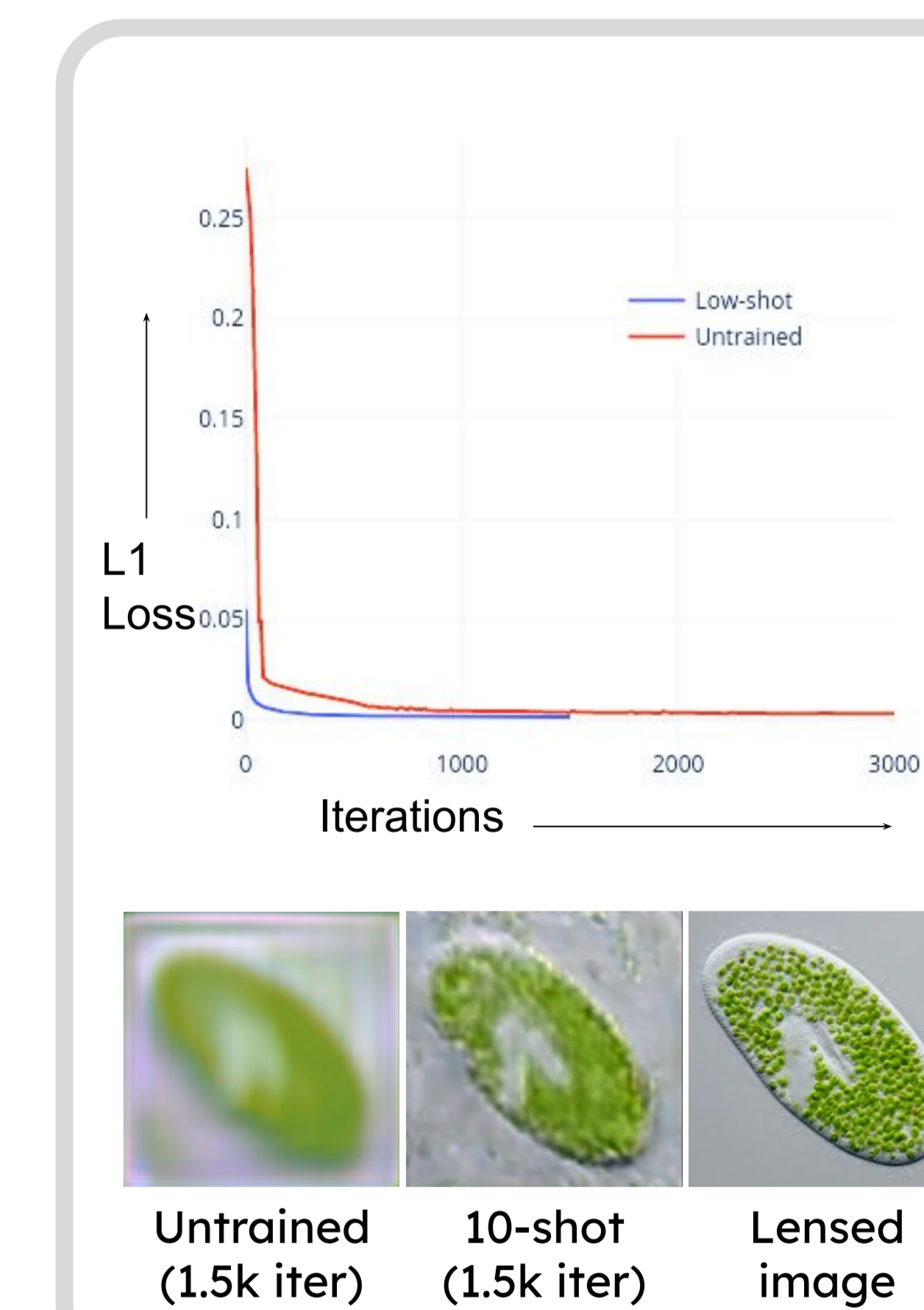


- The low(10)-shot model starts with a low L1 loss due to the pre-training step.
- Hence is able to converge within 1.5k iterations.

### Low-shot pre-training



### Early Convergence



## Results

- We contrastively evaluate the reconstruction performance of our low-shot network against its untrained counterpart and show a significant improvement in reconstruction quality and convergence time.

- We also show how it compares against a fully trained state-of-the-art method [15].

