

# Supporting Information

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This document contains supporting information for the primary paper “Single-shot speckle correlation fluorescence microscopy in thick scattering tissue with image reconstruction priors”. We include additional simulations on the MNIST dataset, a 2D toy examples, and complete simulation results (non-averaged).

## 1 Single layer simulations on MNIST dataset

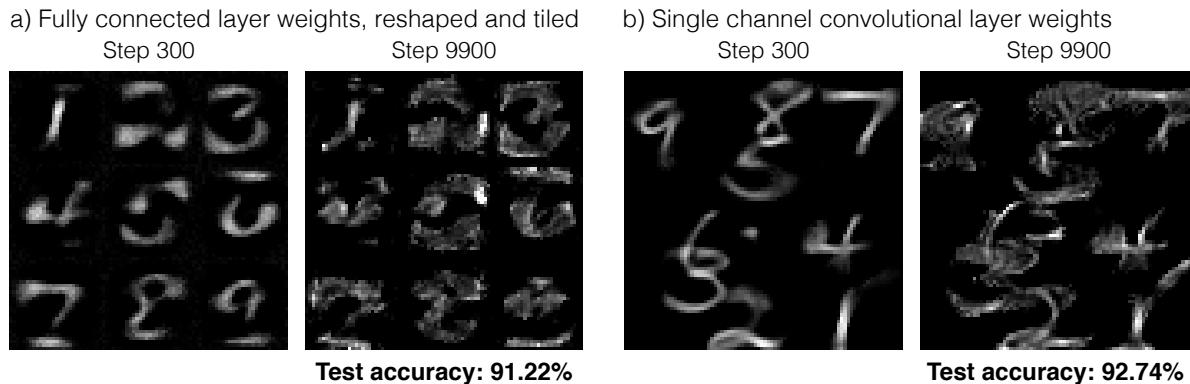


Figure 1: MNIST simulation.

## 2 Effect of negative weights

## 3 Local minima in end-to-end optimization

## 4 Full simulation results

### 4.1 Optical correlator

### 4.2 Hybrid optoelectronic ONN

## References

- [1] B. Judkewitz, R. Horstmeyer, I. Vellekoop, I. Papadopoulos, and C. Yang, Nat. Phys. **11**, 684–689 (2015).

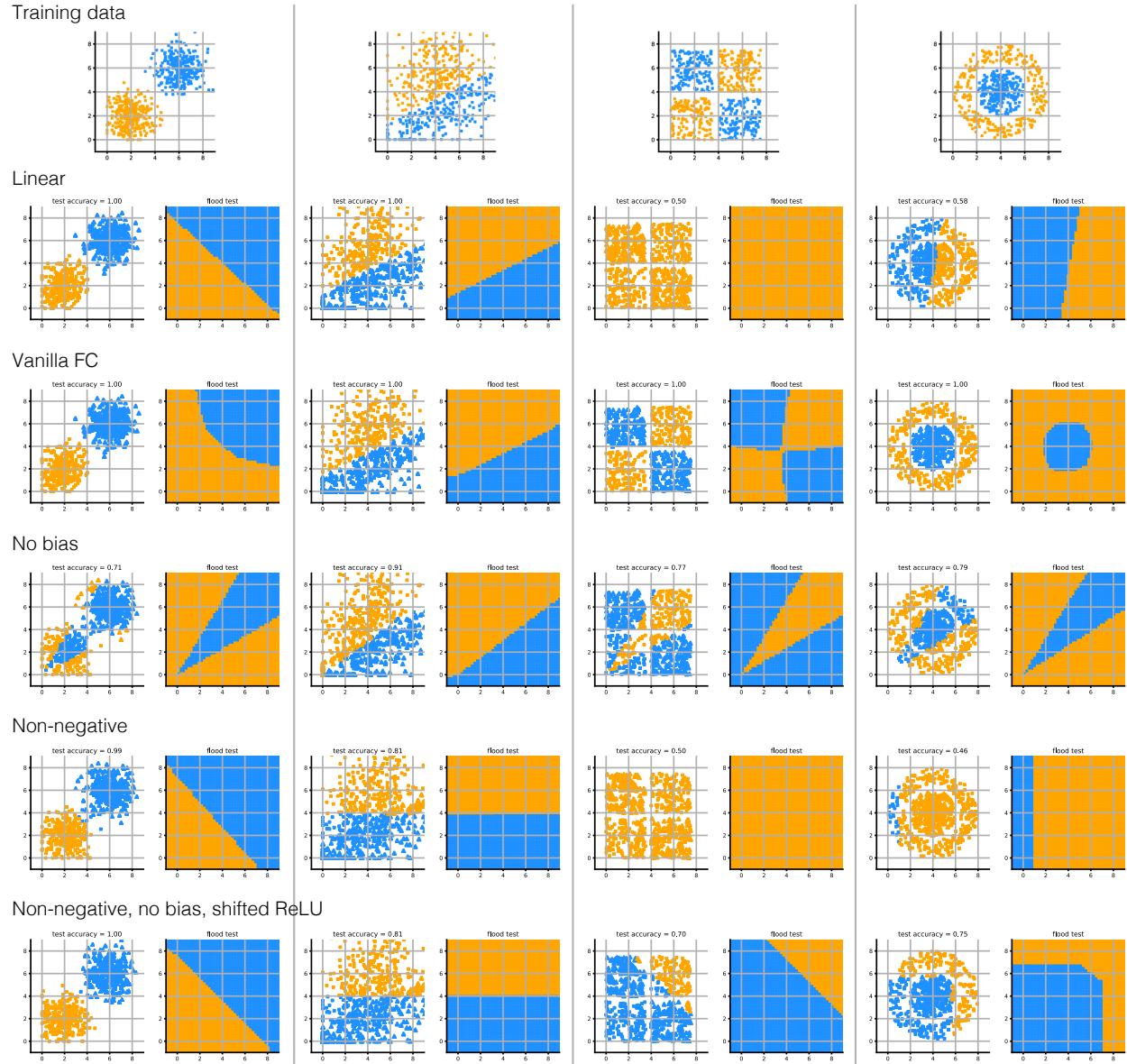


Figure 2: 2D simulation.

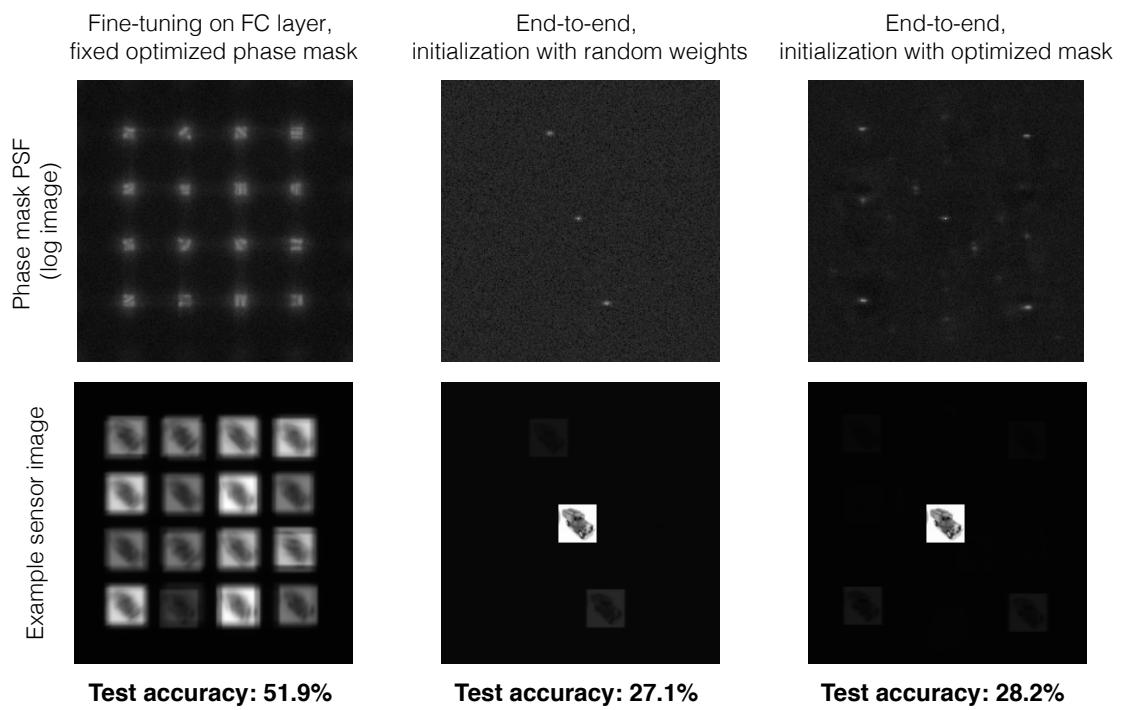


Figure 3: Comparing first layers of multi-step and end-to-end optimization.