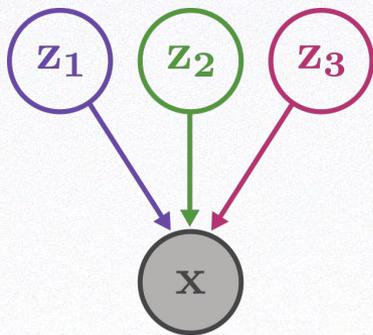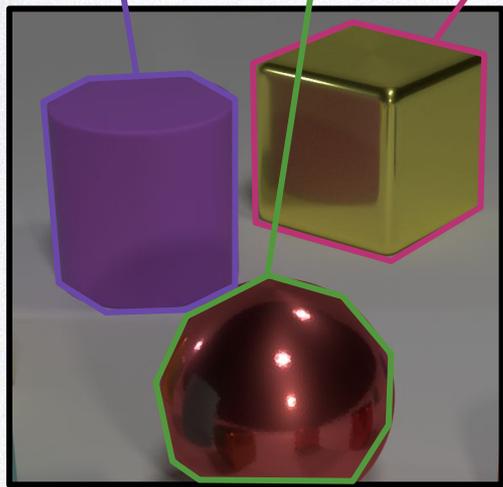# Multi-Object Representation Learning with Iterative Variational Inference

Klaus Greff, Raphaël Lopez Kaufmann, Rishabh Kabra, Nick Watters, Chris Burgess, Daniel Zoran, Loic Matthey, Matthew Botvinick, Alexander Lerchner
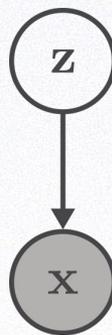
DeepMind

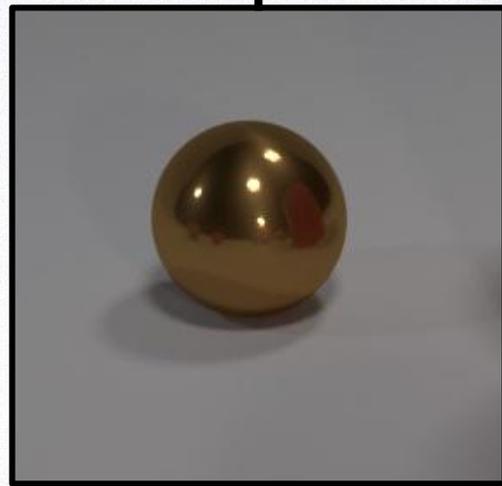# **Multi-Object** Representation Learning

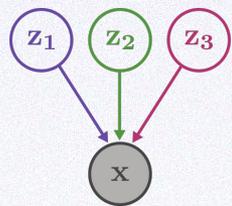# Iterative Object Decomposition Inference NEtwork
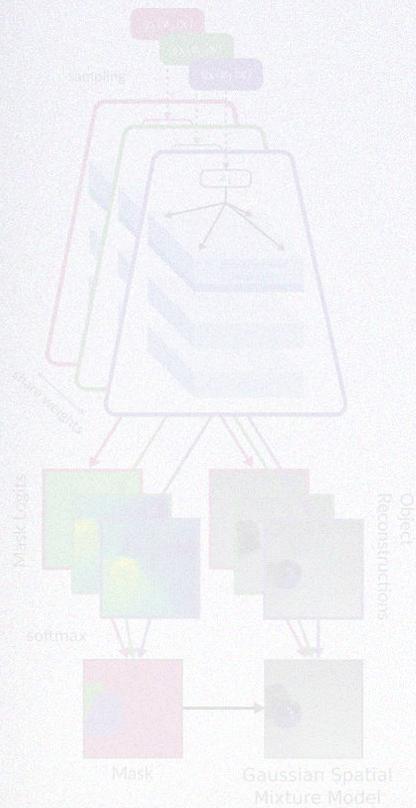
- Built on the **VAE** framework
- Incorporates **multi-object structure**
- **Iterative** variational inference

Iteration 1   Iteration 2
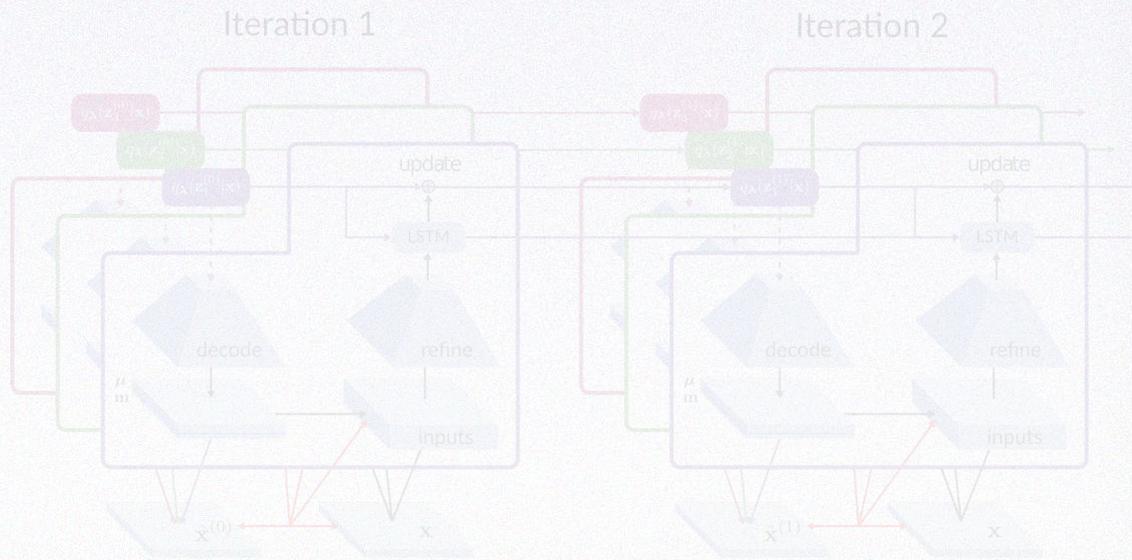
Decoder Structure   Iterative Inference

Iterative Object Decomposition Inference NEtwork

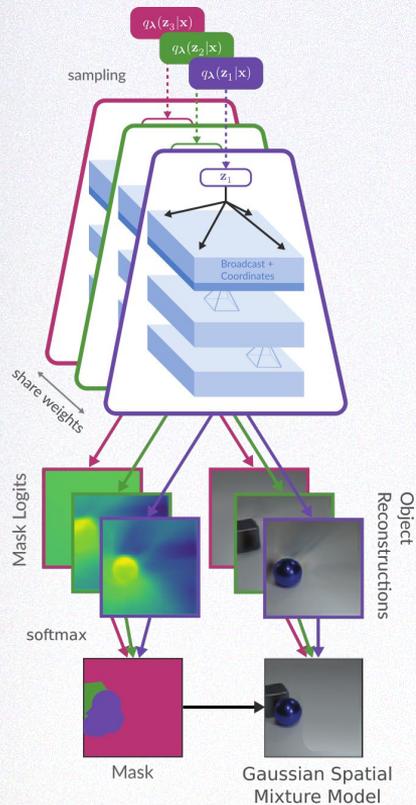

- Built on the **VAE** framework
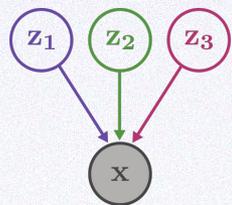- Incorporates **multi-object structure**
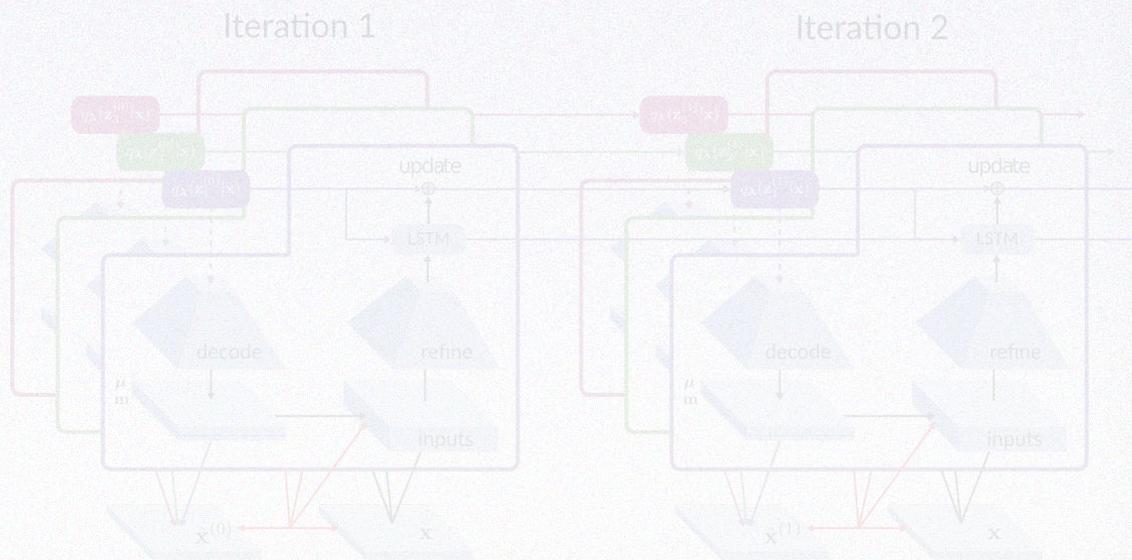- **Iterative** variational inference

Decoder Structure

Iterative Inference

Iterative Object Decomposition Inference NEtwork

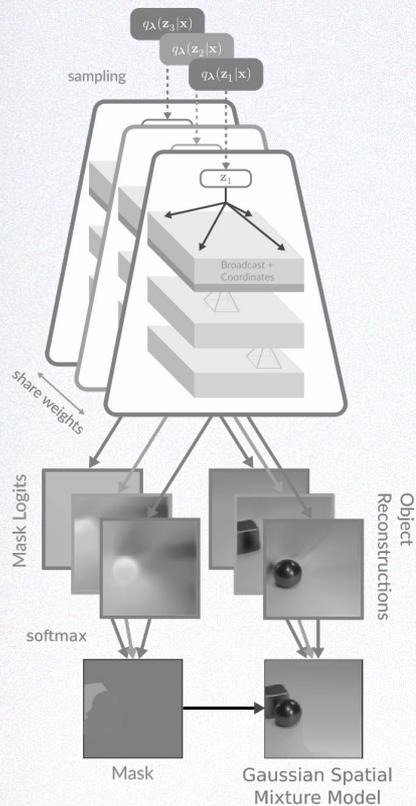
- Built on the **VAE** framework
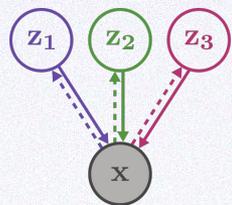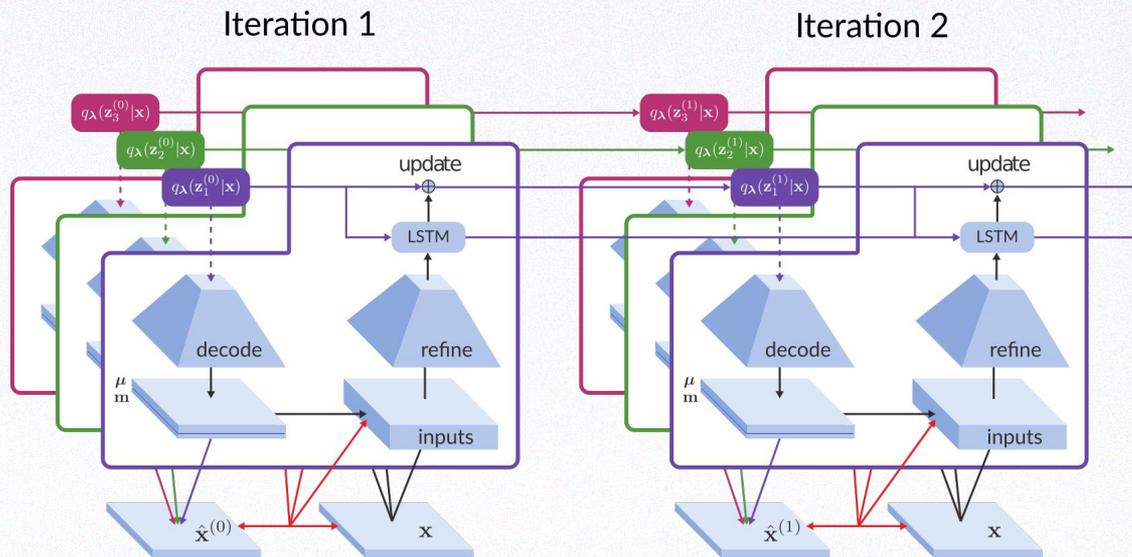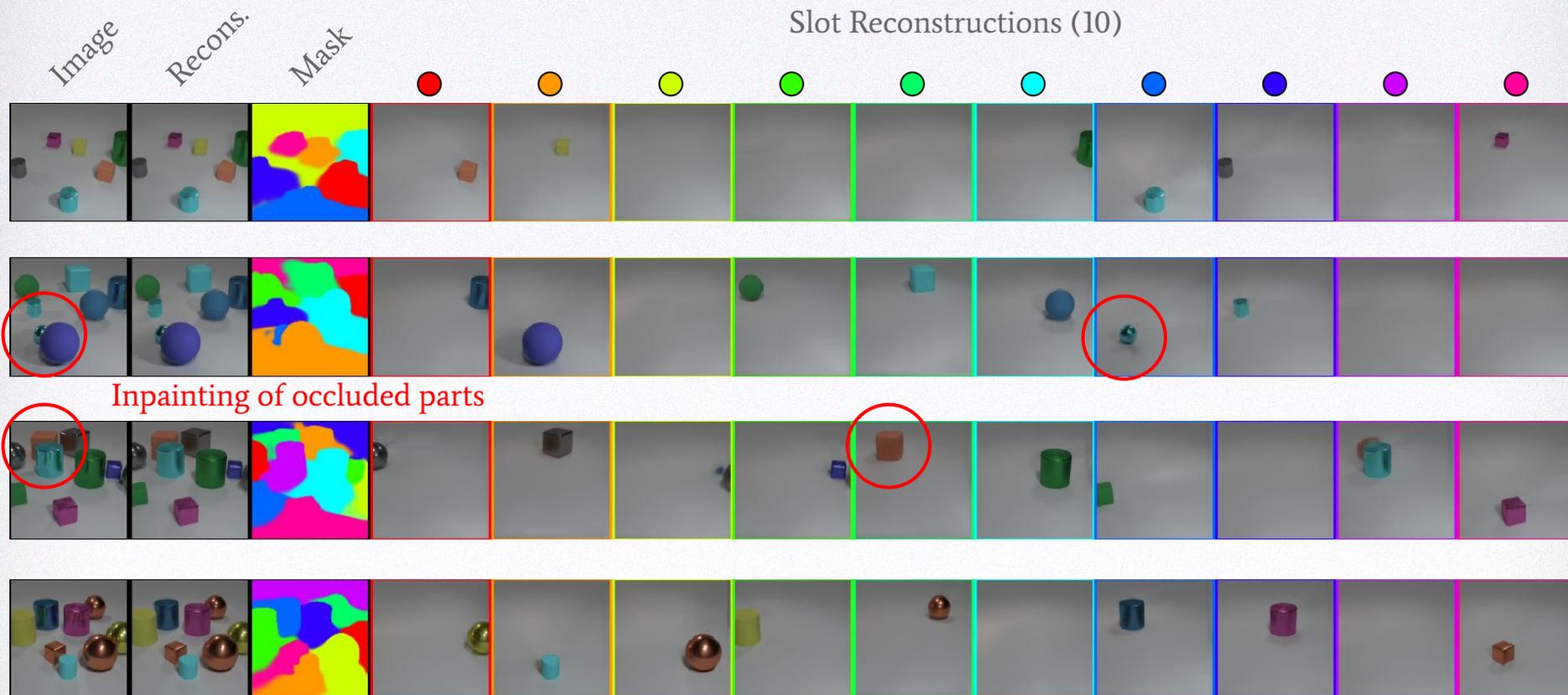- Incorporates **multi-object structure**
- **Iterative** variational inference

Decoder Structure
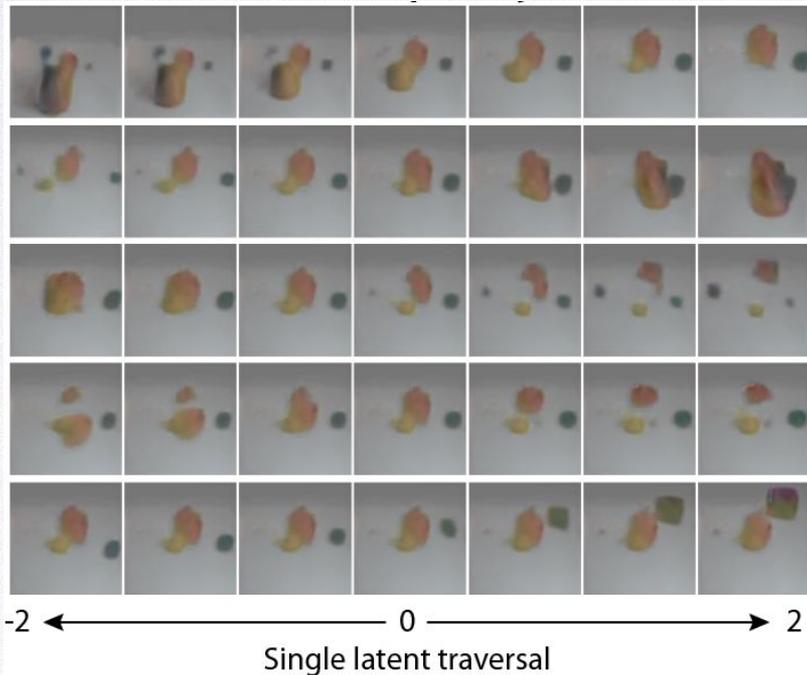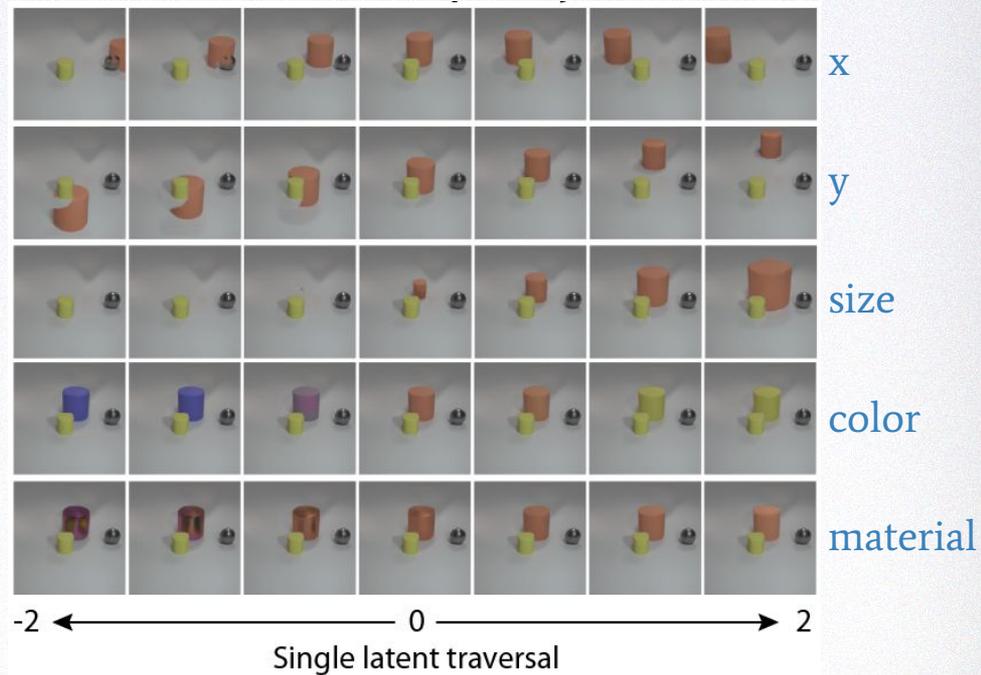
Iterative Inference

Object Decomposition by **IODINE**

Slot Reconstructions (10)

Inpainting of occluded parts

Multi-Object Disentanglement

VAE

IODINE

x
y
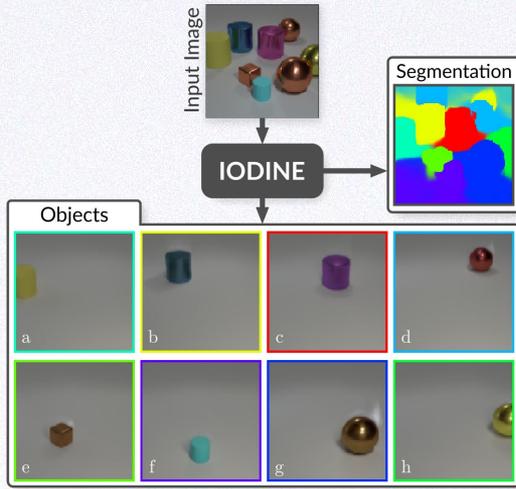size
color
material
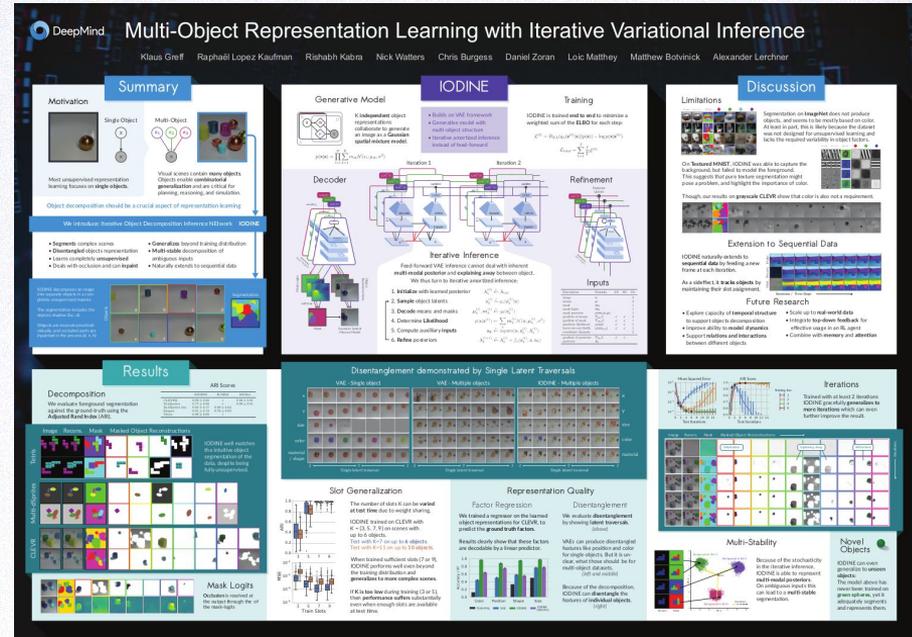
-2 ← → 0 → 2
Single latent traversal

Summary

- **Multi-object** representation learning

- Completely **unsupervised**

- Decomposes an image into individual **objects**

- Learns **disentangled** object representations

Thank you for your Attention!