

- Neural Rendering:

Forward rendering (computer graphics):

Model → Pictures

ML role: sub-module, End-2-End

Inverse rendering (computer vision):

Pictures → Model

ML role: differentiable rendering.

- ML for forward rendering:

① Sub-module

1. After Monte-Carlo e.g. 4 SPP (sample per pixel)

→ Denoising using value network.

Adversarial Monte Carlo denoising with conditioned auxiliary feature modulation [Xu '19]

2. Policy learning (same spp)

Neural importance sampling [Muller '19]

② End-2-End:

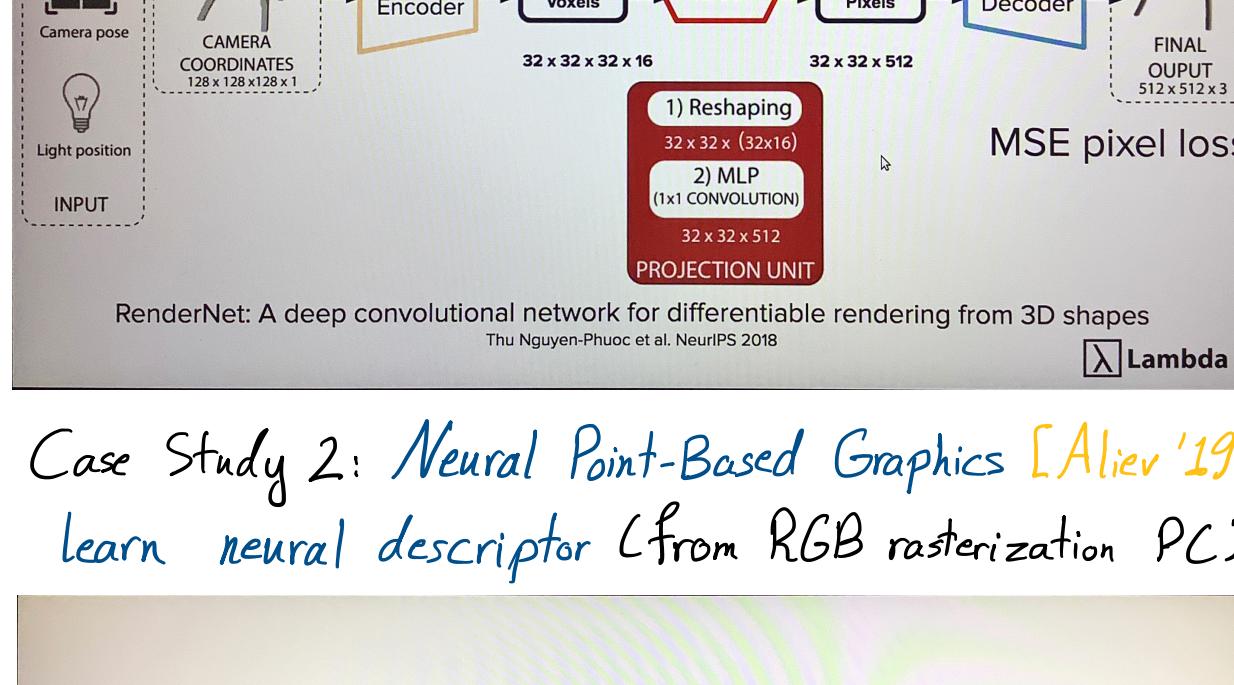
Ray tracing : Image Centric (iterative, recursive)

Rasterization: Object Centric (easier for NN)

3D data representation:

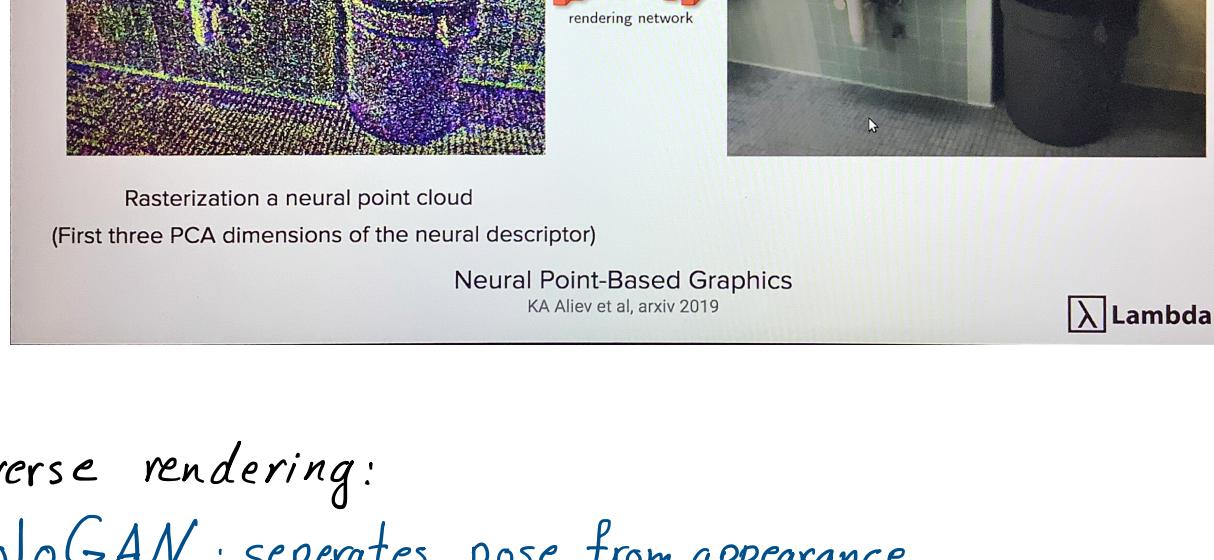
	Depth Map	Voxel	Point Cloud	Mesh
Memory	Good	Very Poor	Poor	Very Good
NN friendly	Great	Yes	No	Enemy

Case study 1: RenderNet (Voxels)



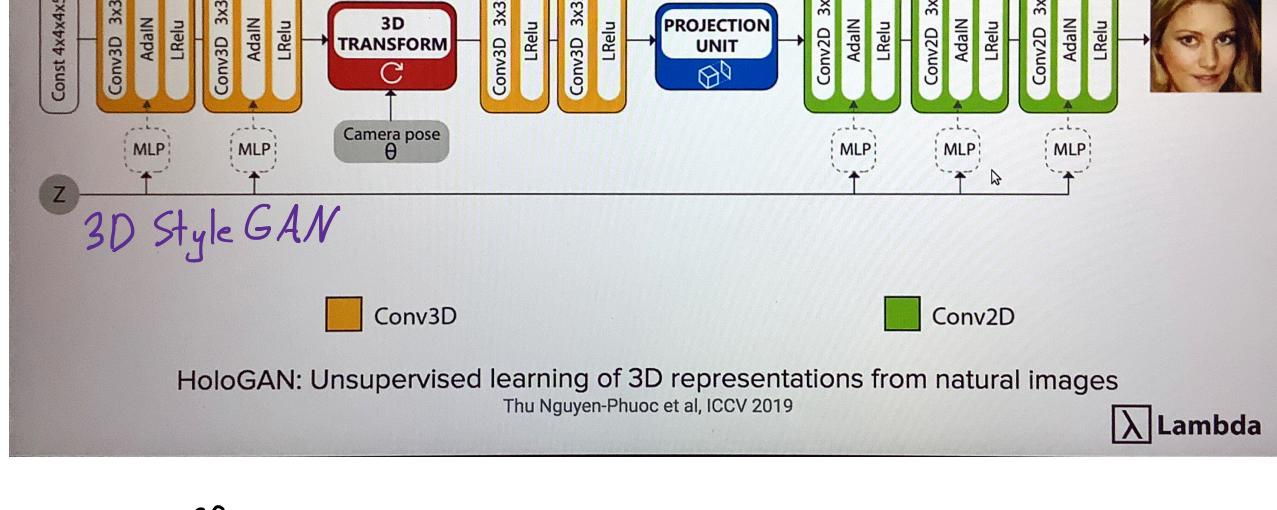
Case Study 2: Neural Point-Based Graphics [Aliiev '19]

learn neural descriptor (from RGB rasterization PC)



- Inverse rendering:

HoloGAN: separates pose from appearance.



Differentiable rendering (representation learning).