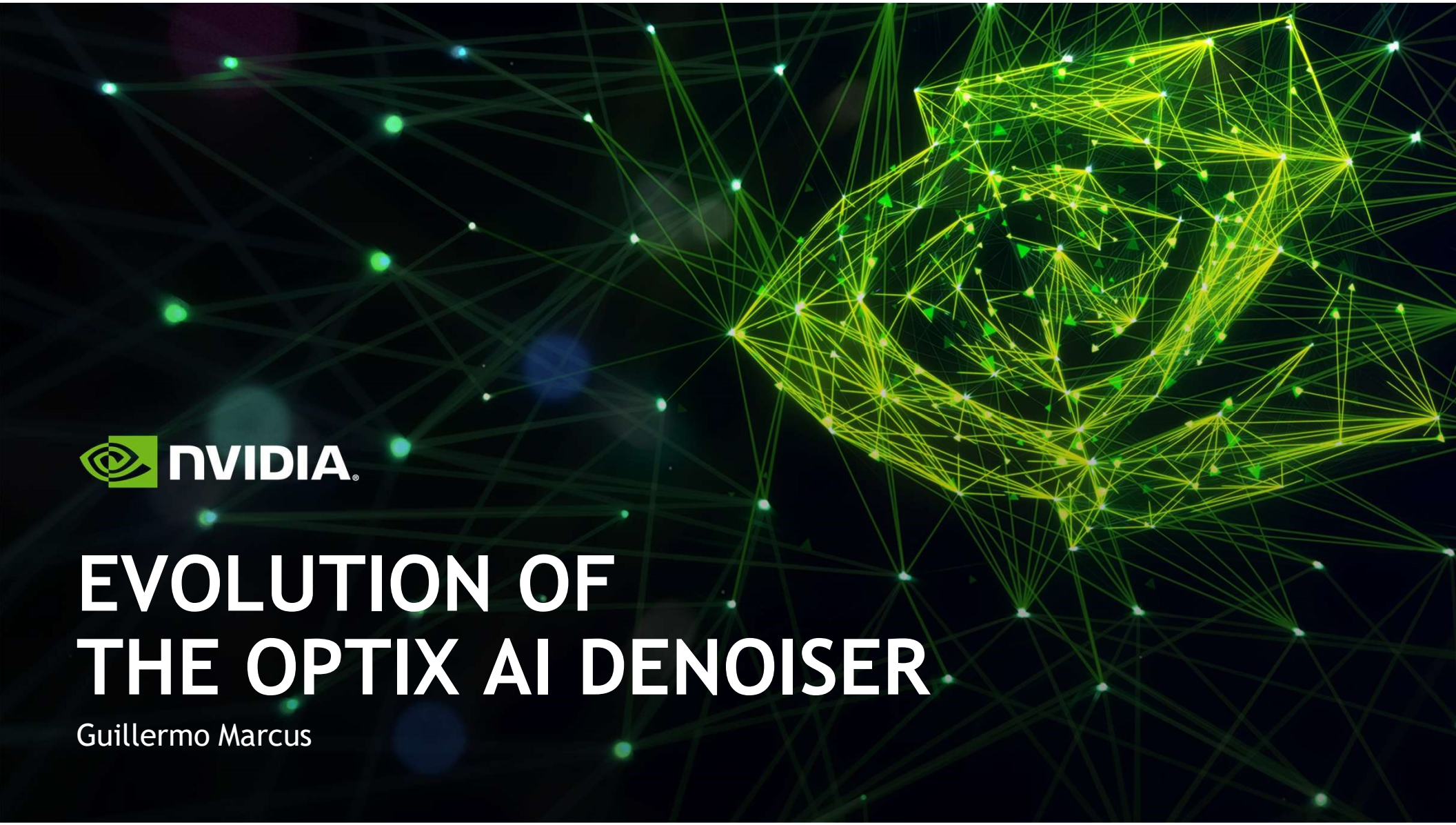


EVOLUTION OF THE OPTIX AI DENOISER

Guillermo Marcus

OVERVIEW

Why denoise?

Deep Learning for Noise reduction

Access to the OptiX AI Denoiser

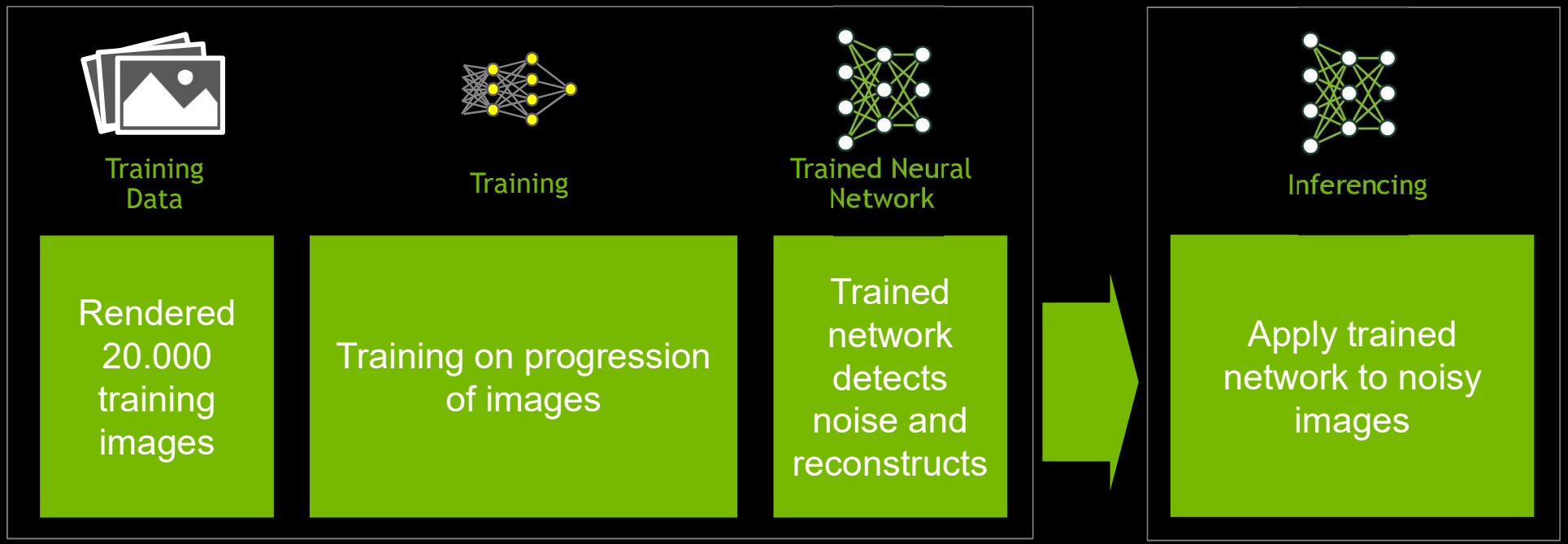
What is new for 2018: Improvements and issues fixed

WHY DENOISE?

In interactive navigation, images can look very noisy giving a hard time to spot the details

Final frame rendering of complex scenes requires a very long time to fully resolve noise for professional delivery

AI DENOISER


Training Data
Training
Trained Neural Network
Inferencing
Rendered 20.000 training images
Training on progression of images
Trained network detects noise and reconstructs
Apply trained network to noisy images


Reference
Denoised

ACCESS TO THE OPTIX AI DENOISER

- Use an Application with integrated AI Denoiser support
  - Redshift, Arnold, Vray, Clarisse, Solidworks, Iray, and more to come.
- Use the OptiX API for denoising to integrate it into your own application.
- You can train your own dataset, see the training tutorial "*Rendered Image Denoising using Autoencoders*" published at the Deep Learning Institute


WHAT IS NEW IN 2018
IMPROVEMENTS

SPEED IMPROVEMENTS

- Huge improvements in performance in Volta and Turing thanks to better utilization of TensorCores.
- No speed difference between LDR and HDR
- OptiX 5.1 is not tuned for Turing (new kernels improve performance in next version)

Card	Denoising time
Pascal	125 ms
Volta	17 ms
Turing	39 ms

BETTER QUALITY

- Improve performance in low sampling areas for interactive use cases
- Less painterly effects
- Better denoising of color channels
- See also Carsten Wächter presentation “Adaptive Rendering powered by new OptiX SDK AI features”

Reference image


OptiX 5.0 – no albedo


OptiX 5.0


OptiX 5.1 Beta

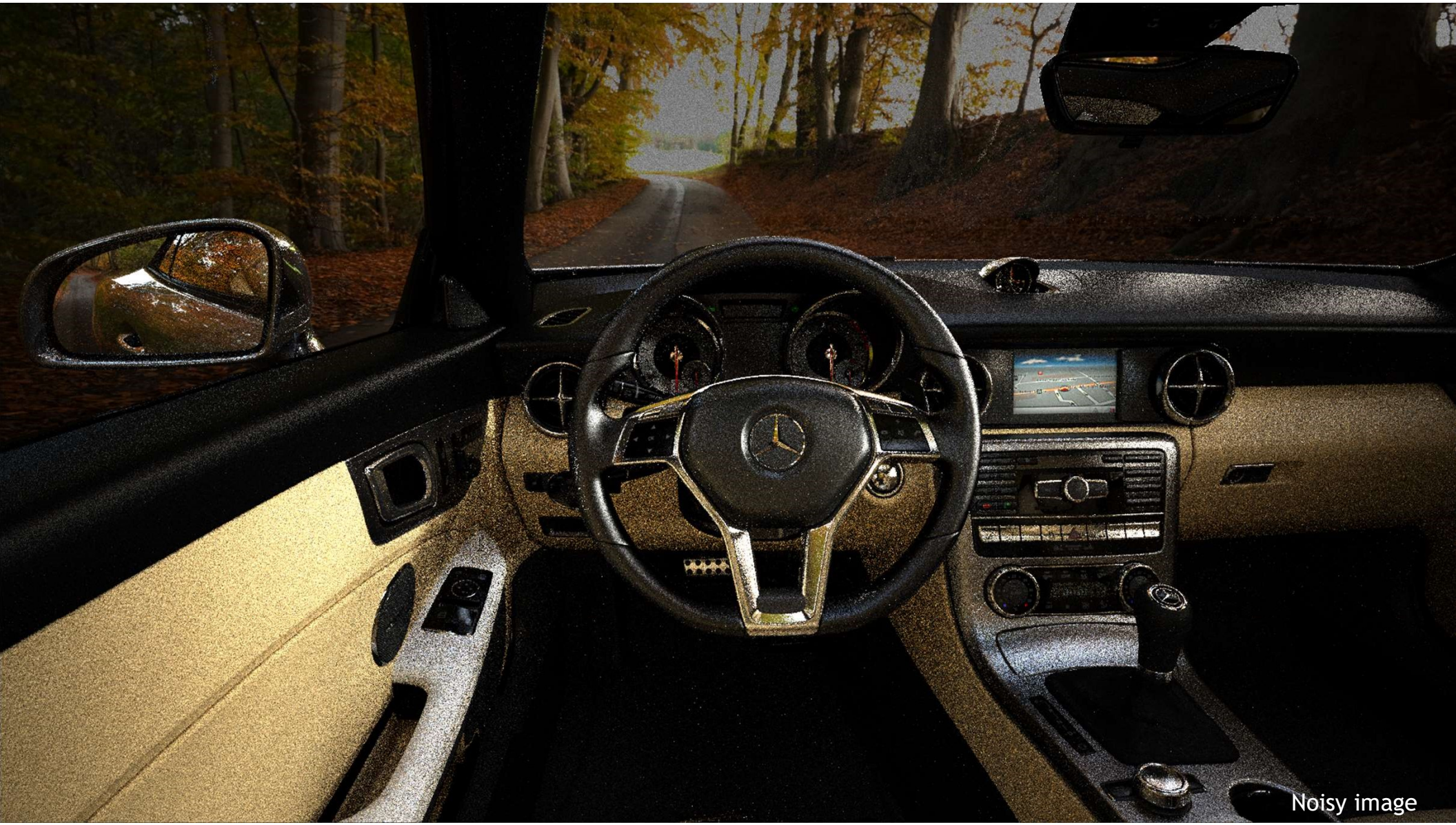

OptiX 5.1

Reference image

DENOISING HDR IMAGES

- Support for High Dynamic Range image denoising
- Improved quality with very dark and very bright images due to autoexposure
- No performance hit


Reference image

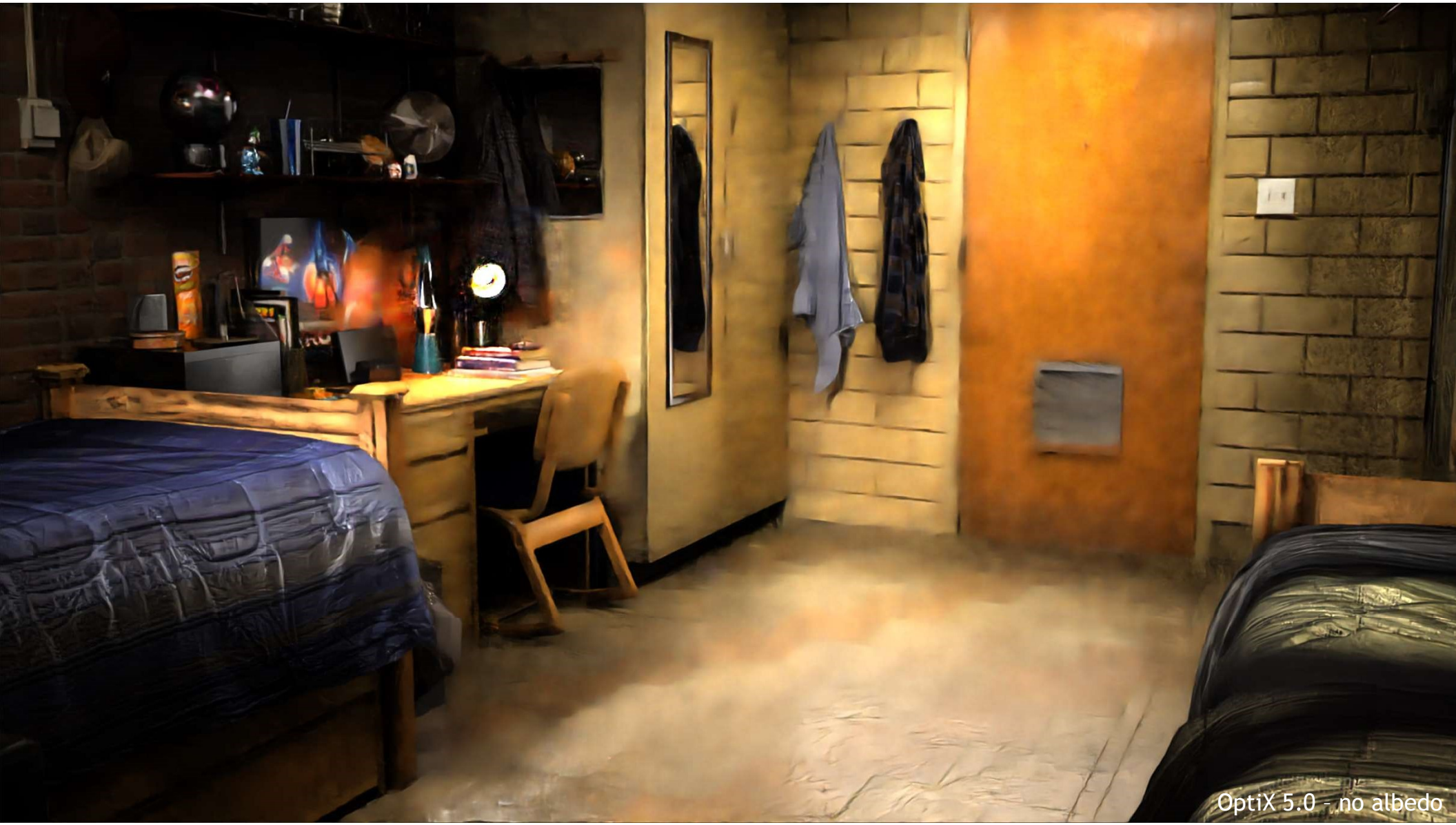

Noisy image

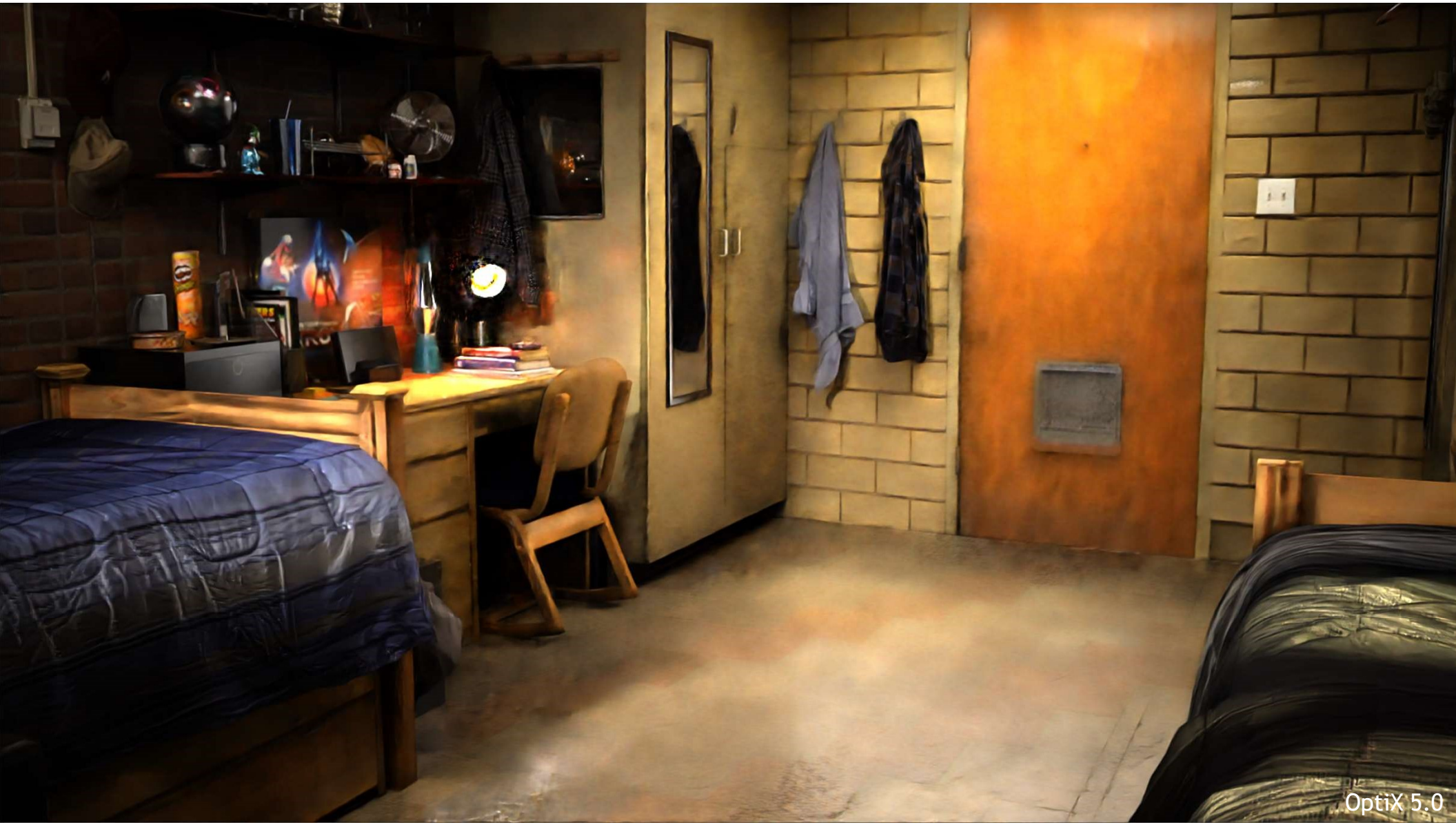

Denoised LDR


Denoised HDR


Reference image


Reference image


OptiX 5.0 - no albedo


OptiX 5.0


OptiX 5.1 Beta HDR


OptiX 5.1 HDR


Reference image


Thank You!
NVIDIA