# IRAY INTERACTIVE

## *RAYTRACING INTERIORS FOR STILLS AND VR WITHIN MINUTES*

Pascal Gautron, Project Leader

pgautron@nvidia.com

NVIDIA

# AWESOME

Tech Design

Automotive

NVIDIA® Iray®


Architecture


Fashion

# PHOTOREALISM IS ALSO COSTLY

# RENDERING SOLUTIONS

Photorealistic Rendering

Raster Graphics

# TYPICAL DESIGN WORKFLOW

Photorealistic Rendering

Alternative Solutions
"Previews"

Raster Graphics

# TYPICAL DESIGN WORKFLOW

Raster Graphics

Alternative Solutions
"Previews"

Yes!

?

NO!

Yes, but...

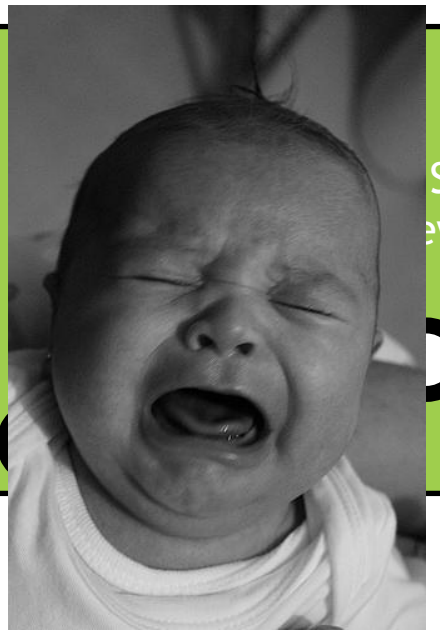
could that table look more cheerful?

Photorealistic Rendering

# TYPICAL DESIGN WORKFLOW

Raster Graphics

Solutions
ews”



Photorealistic Rendering

# $1,000,000 QUESTION

Photorealistic Rendering


$E_v$=97.2284 lx ?

# $1,000,000 QUESTION

# DESIGNING WITH NVIDIA® Iray®

Photoreal

Interactive

# DESIGNING WITH NVIDIA® Iray®

Photoreal

Interactive

# DESIGNING WITH NVIDIA® Iray®

Photoreal

Interactive

# CONCEPT

NVIDIA® Iray®
Photoreal 4h30

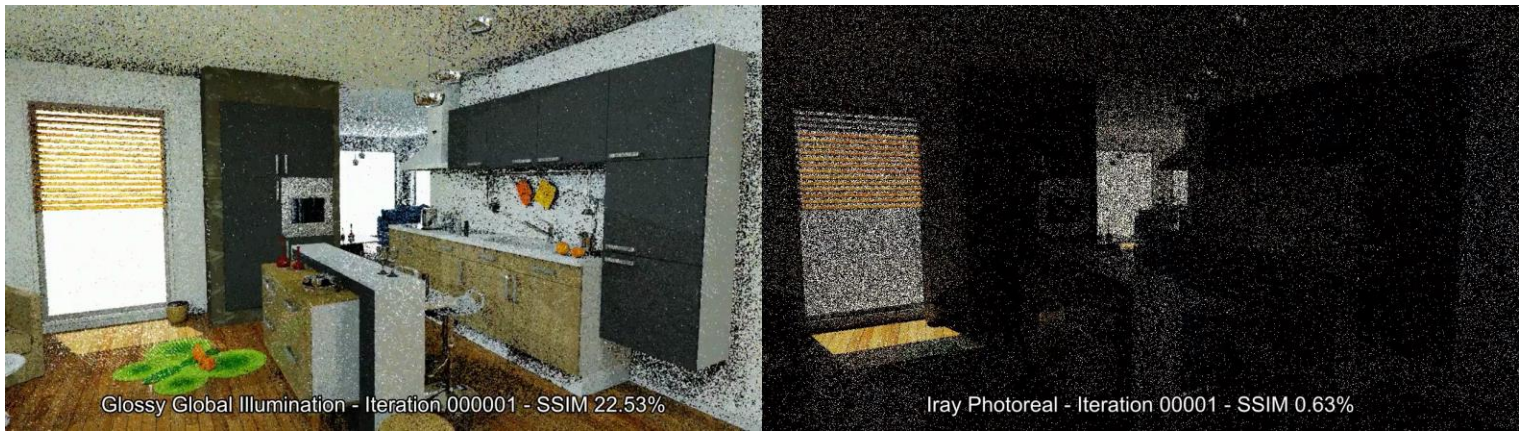
Speed 71.7X

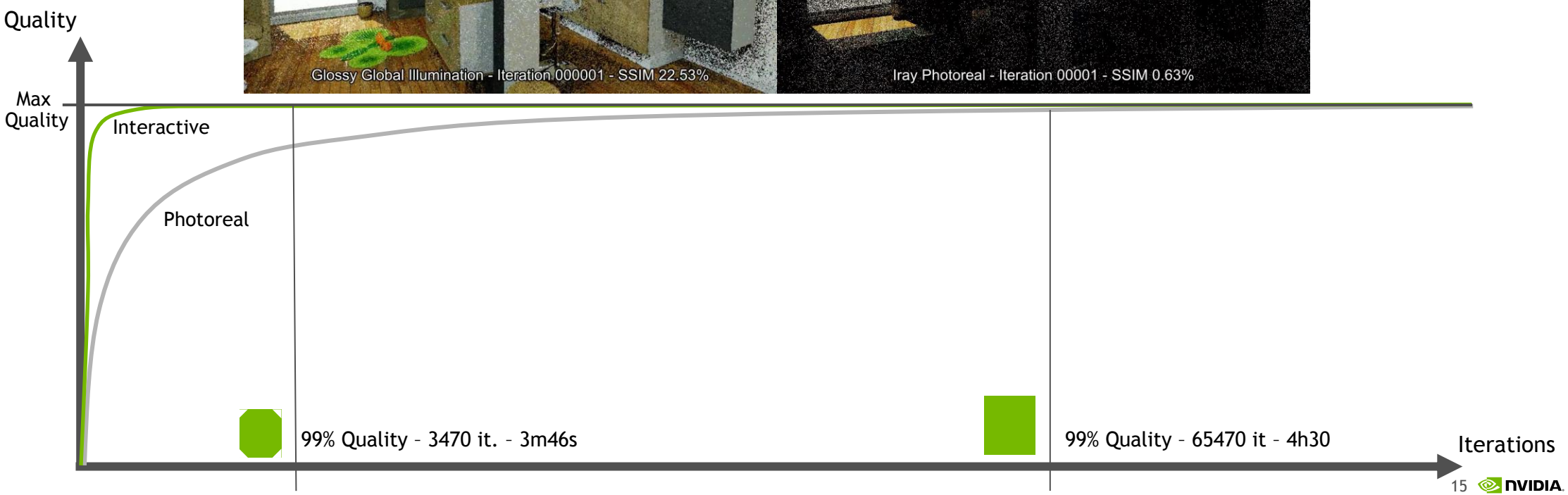
3min46s

NVIDIA® Iray®
Interactive

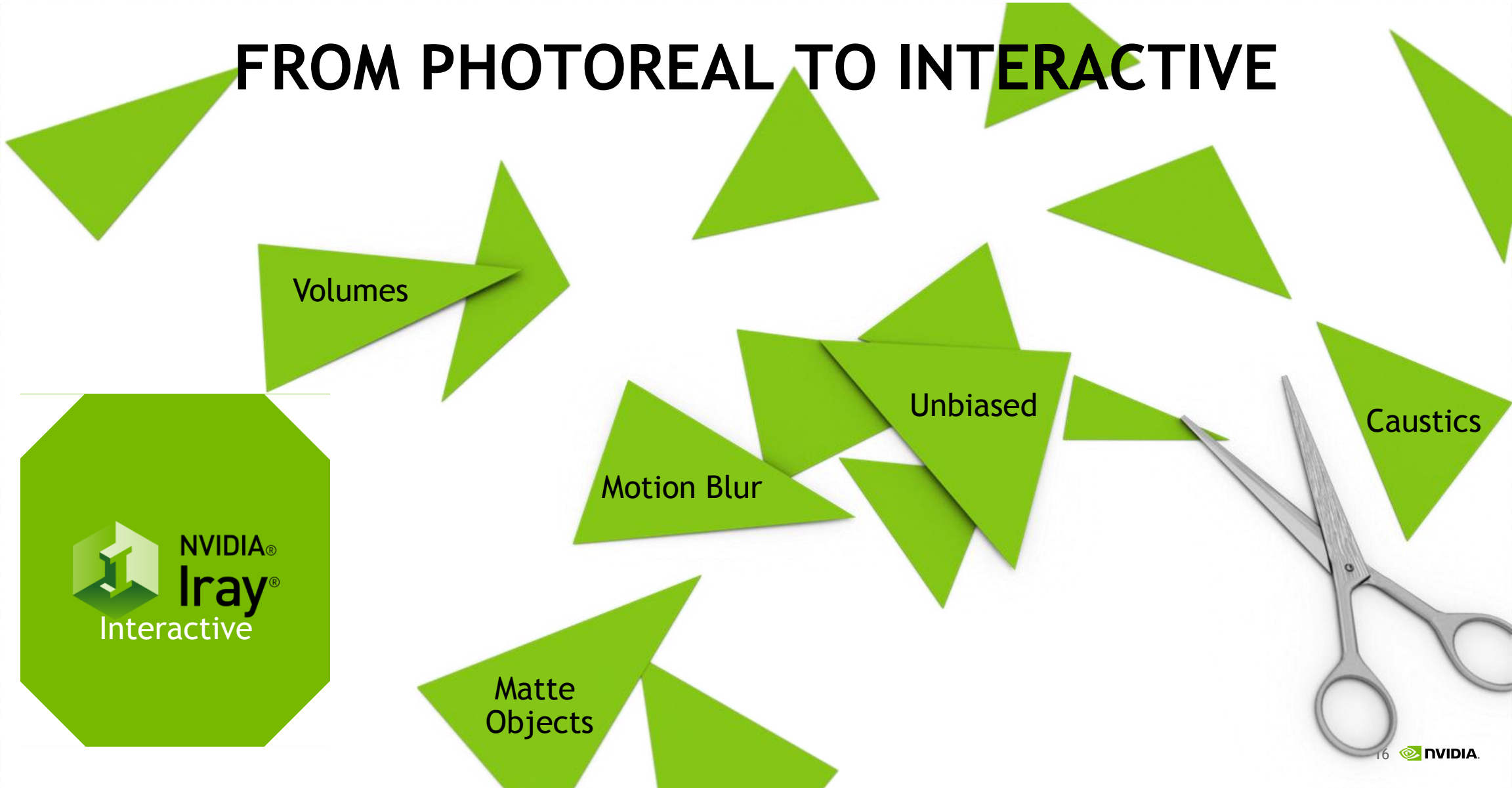
1280x720, Quadro M6000

# CONVERGENCE



# FROM PHOTOREAL TO INTERACTIVE

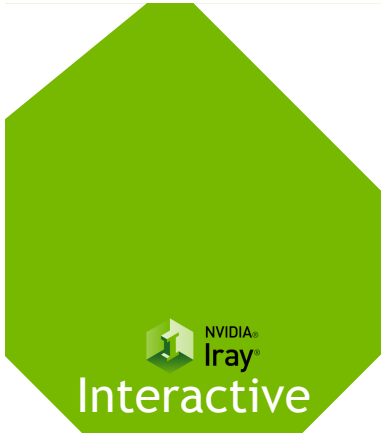


# IRAY INTERACTIVE

## Flexible Rendering


3D Modeling


Visual Review

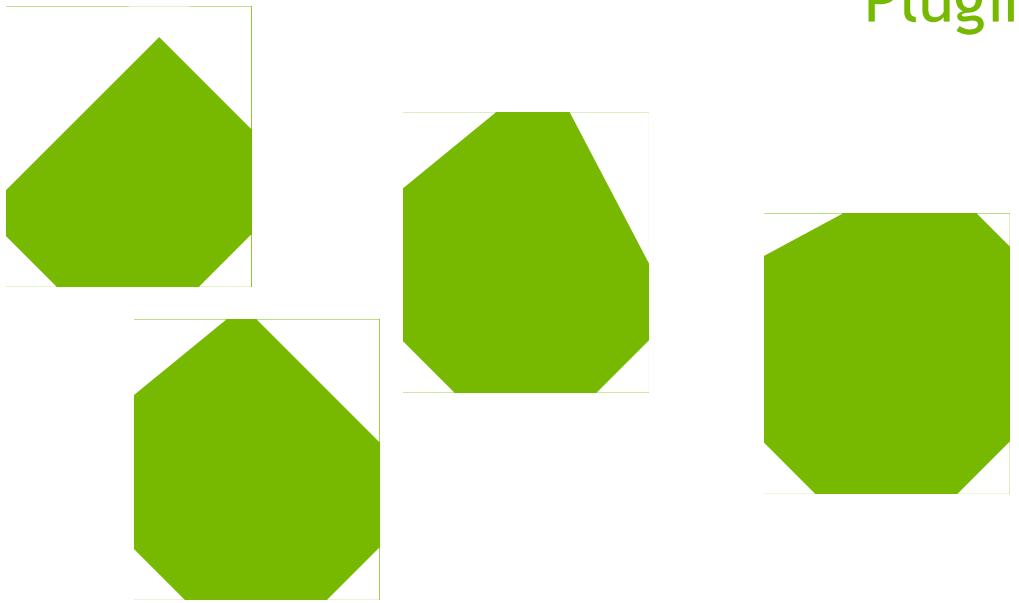



Interior Layout

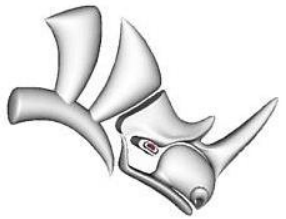

Final Validation

# NVIDIA IRAY

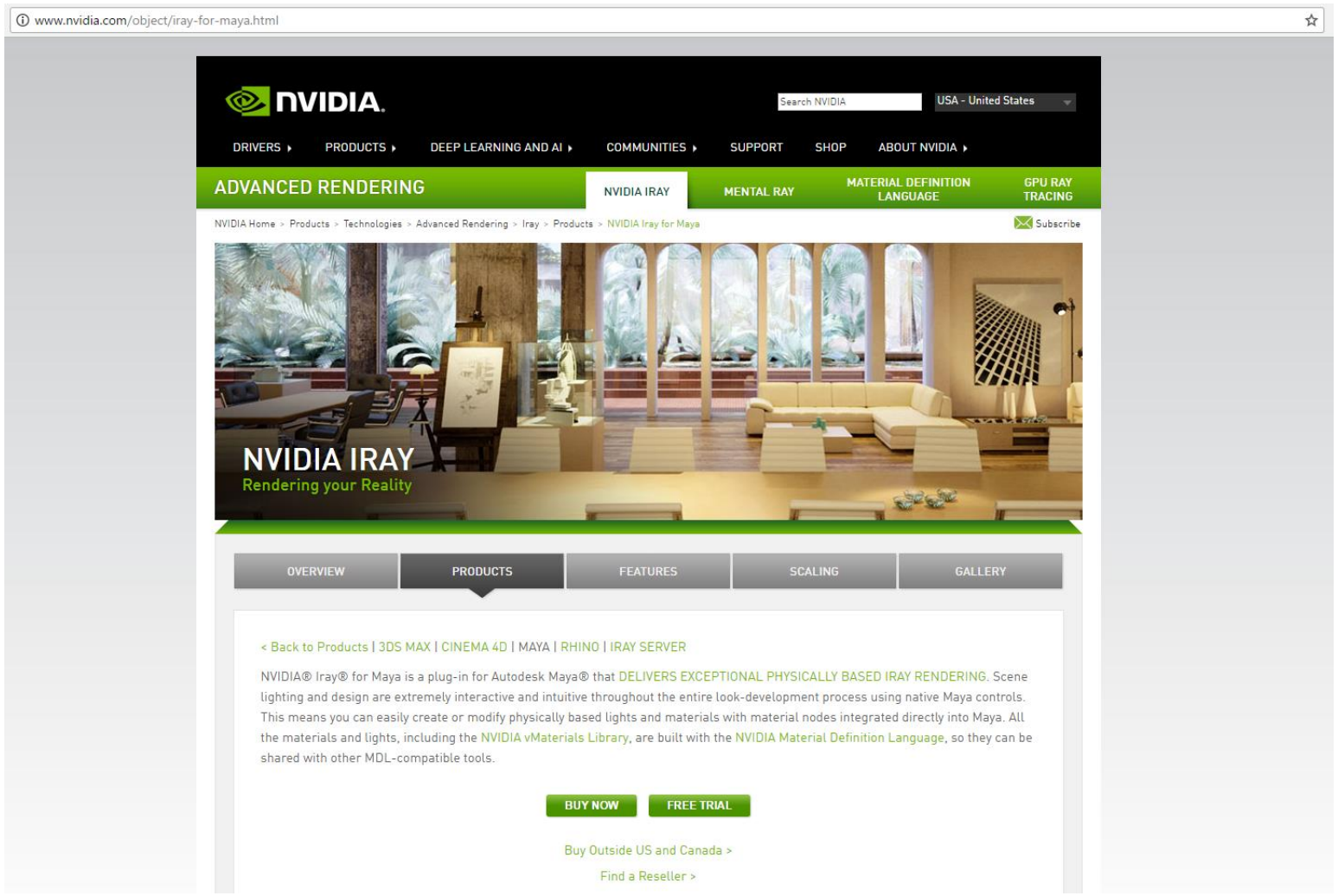
## Plugins



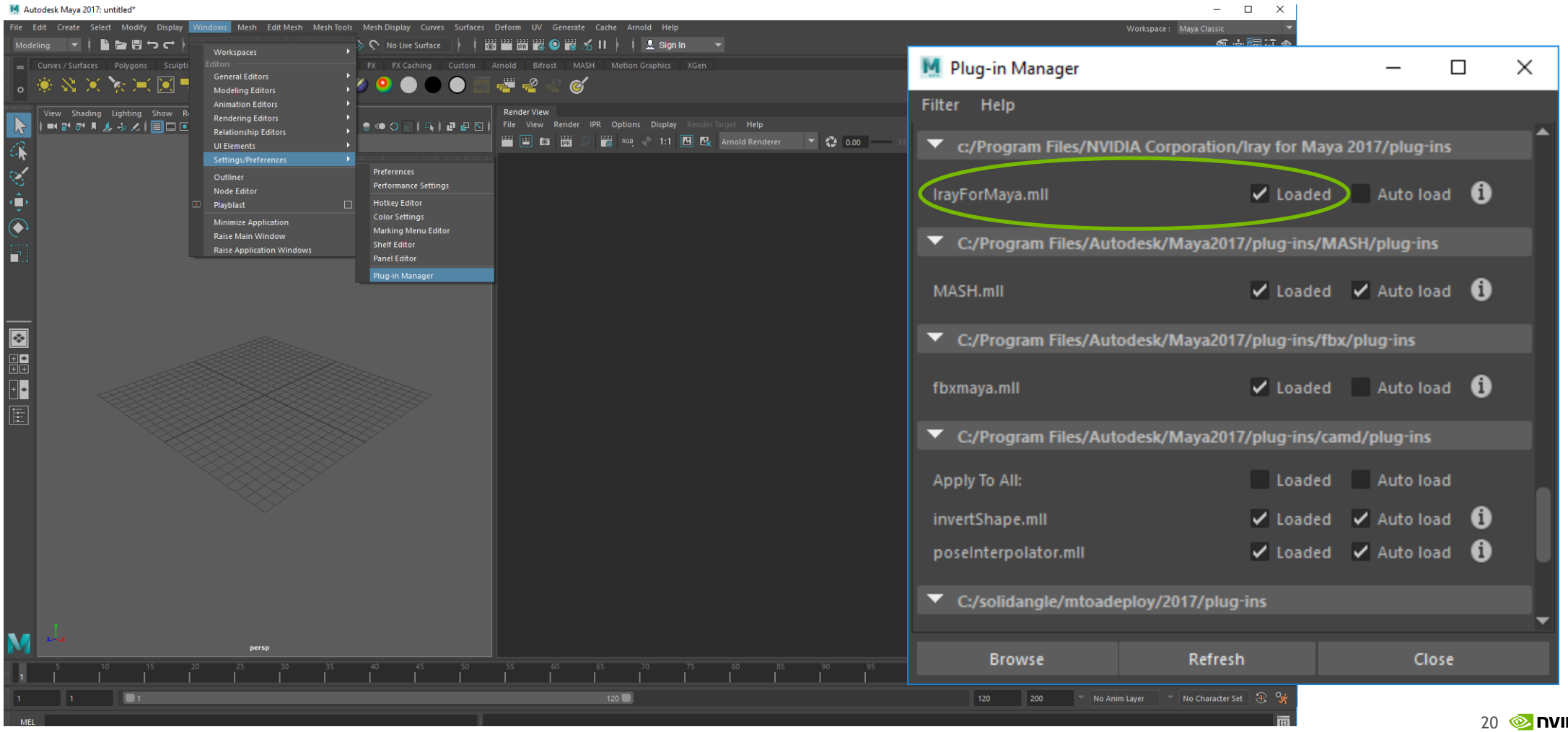




# IRAY FOR MAYA



# IRAY FOR MAYA



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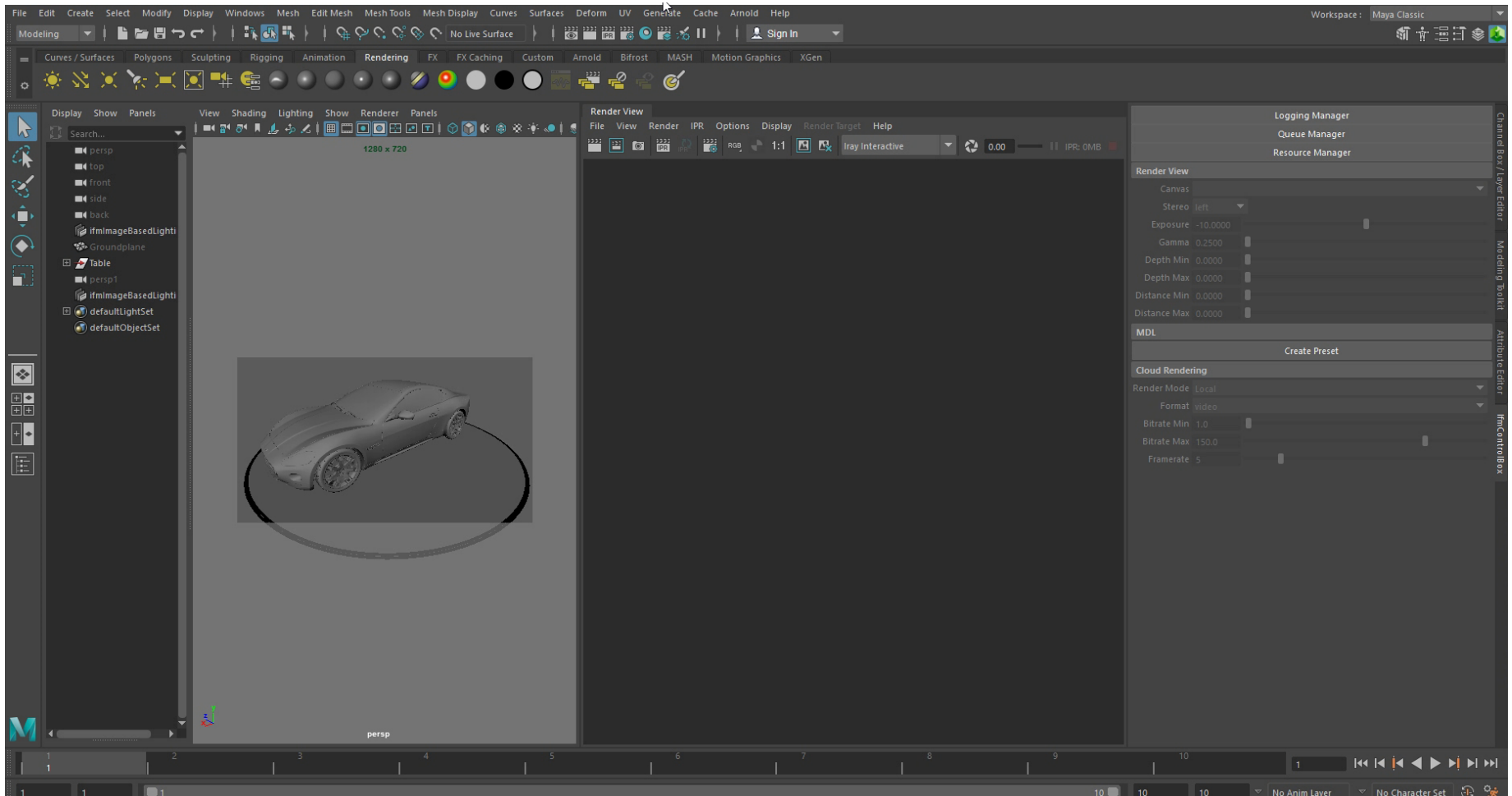
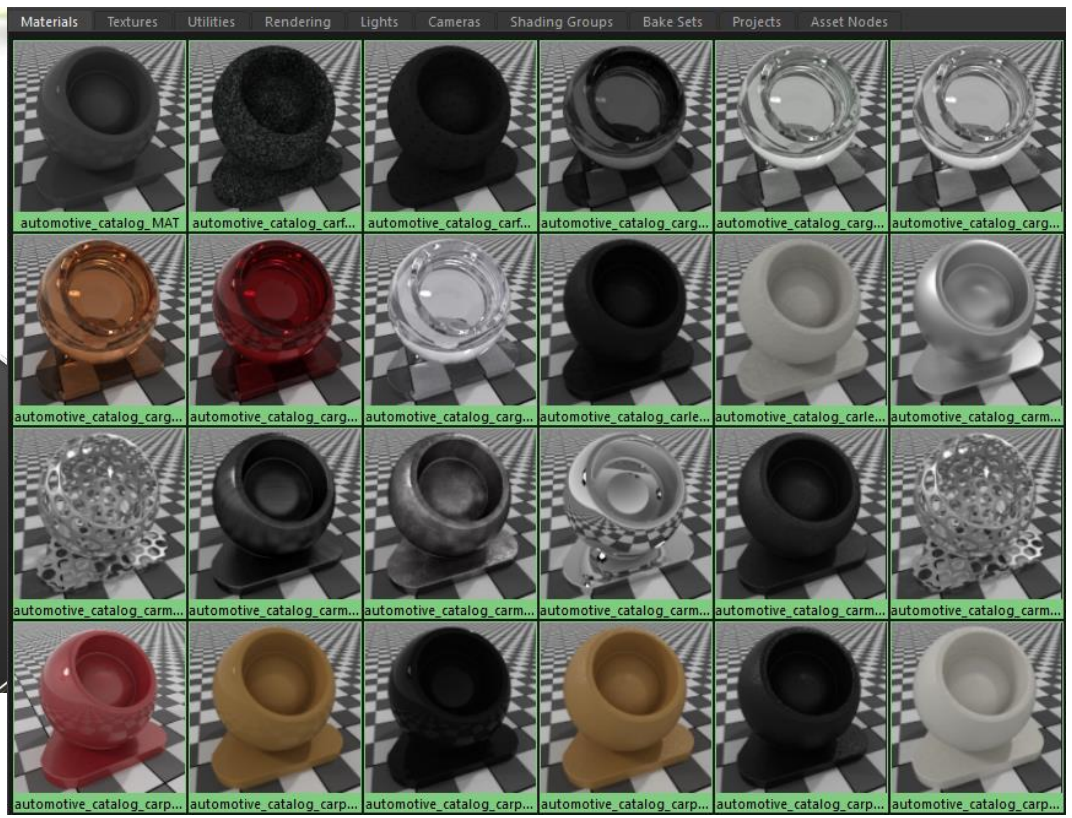


# IRAY FOR MAYA

## MDL Materials

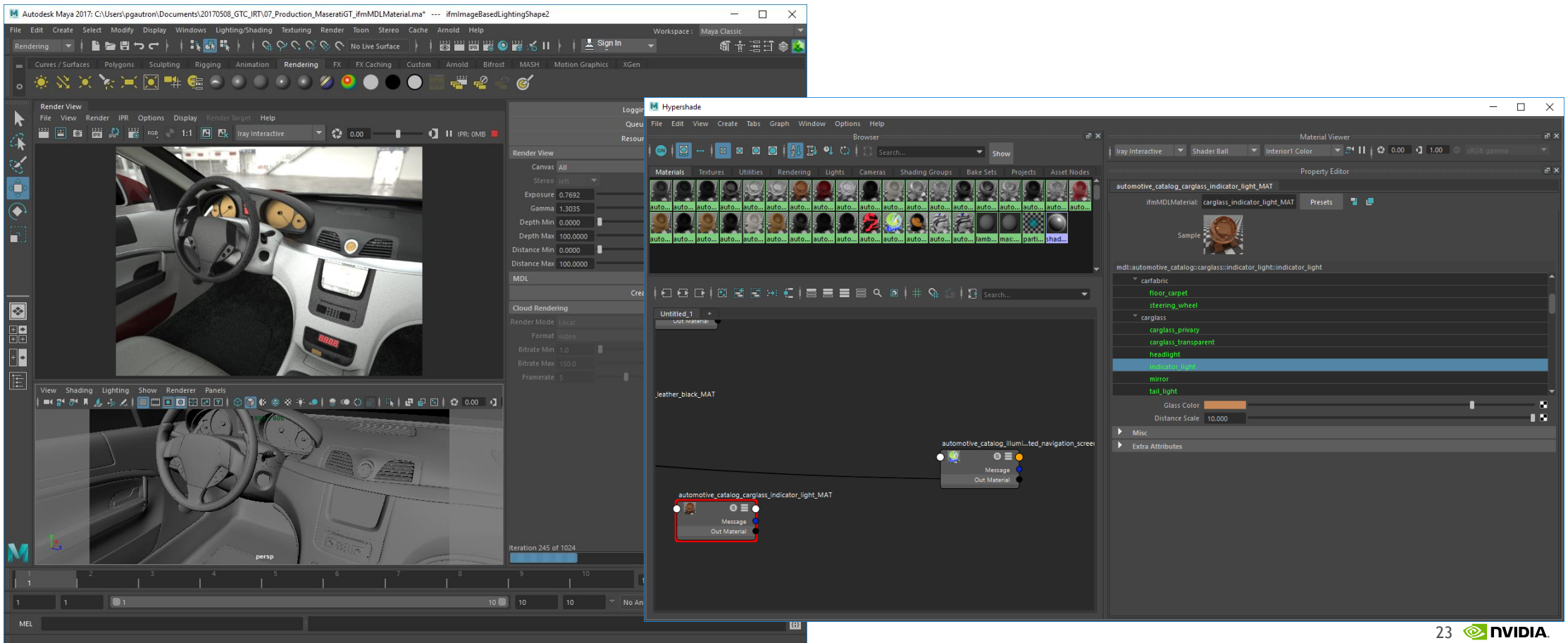



http://mdlhandbook.com

More on MDL: Get the recording this morning's session on MyGTC
"Sharing Physically-Based Materials Between Renderers", L. Kettner and J. Jordan

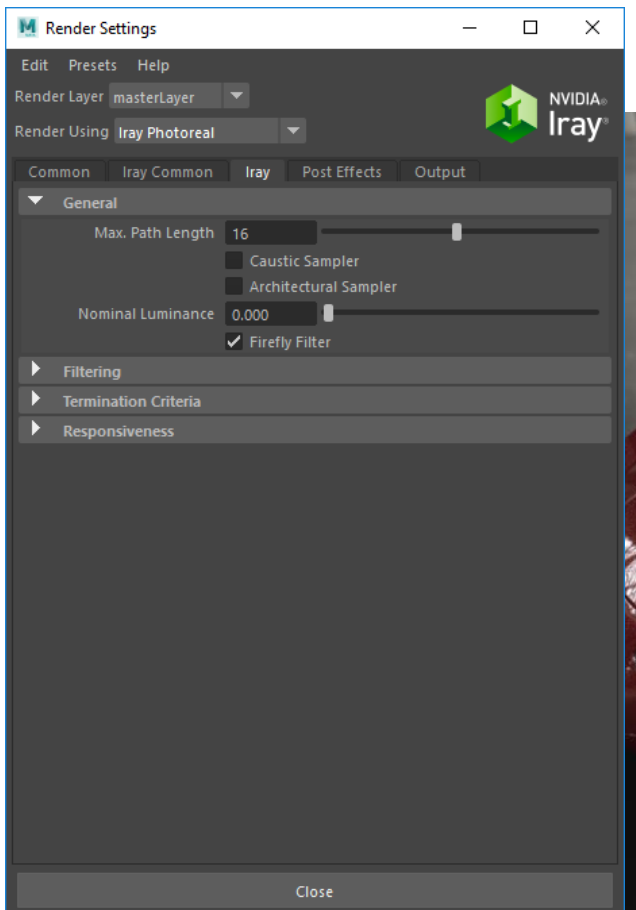
# IRAY FOR MAYA

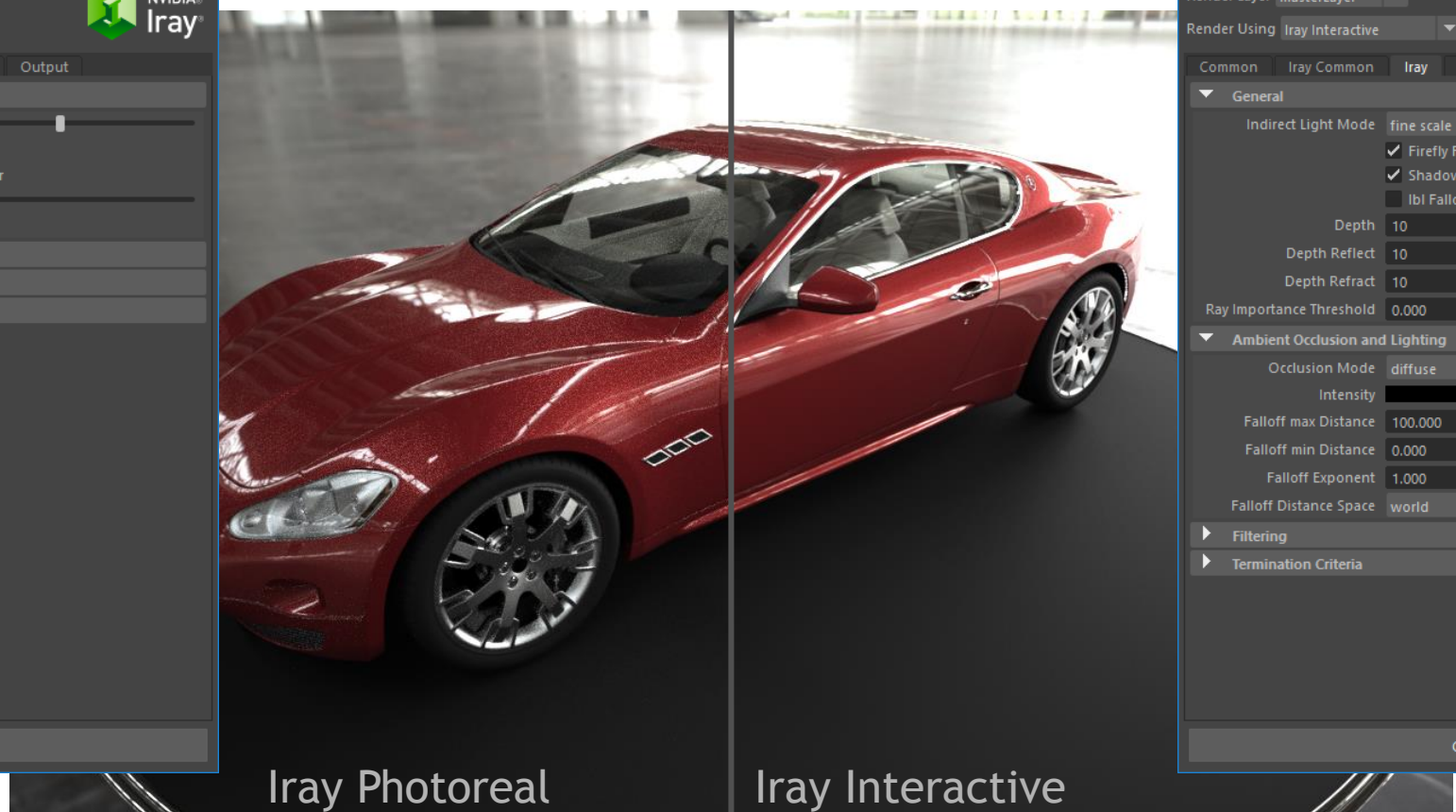
## MDL in Hypershade

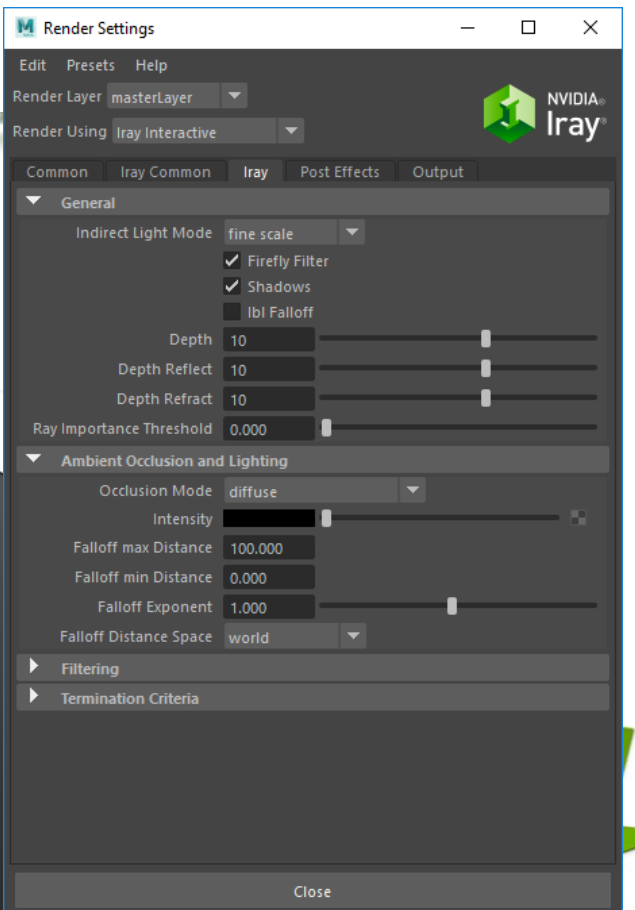


# IRAY FOR MAYA

## Render Settings



# IRAY INTERACTIVE

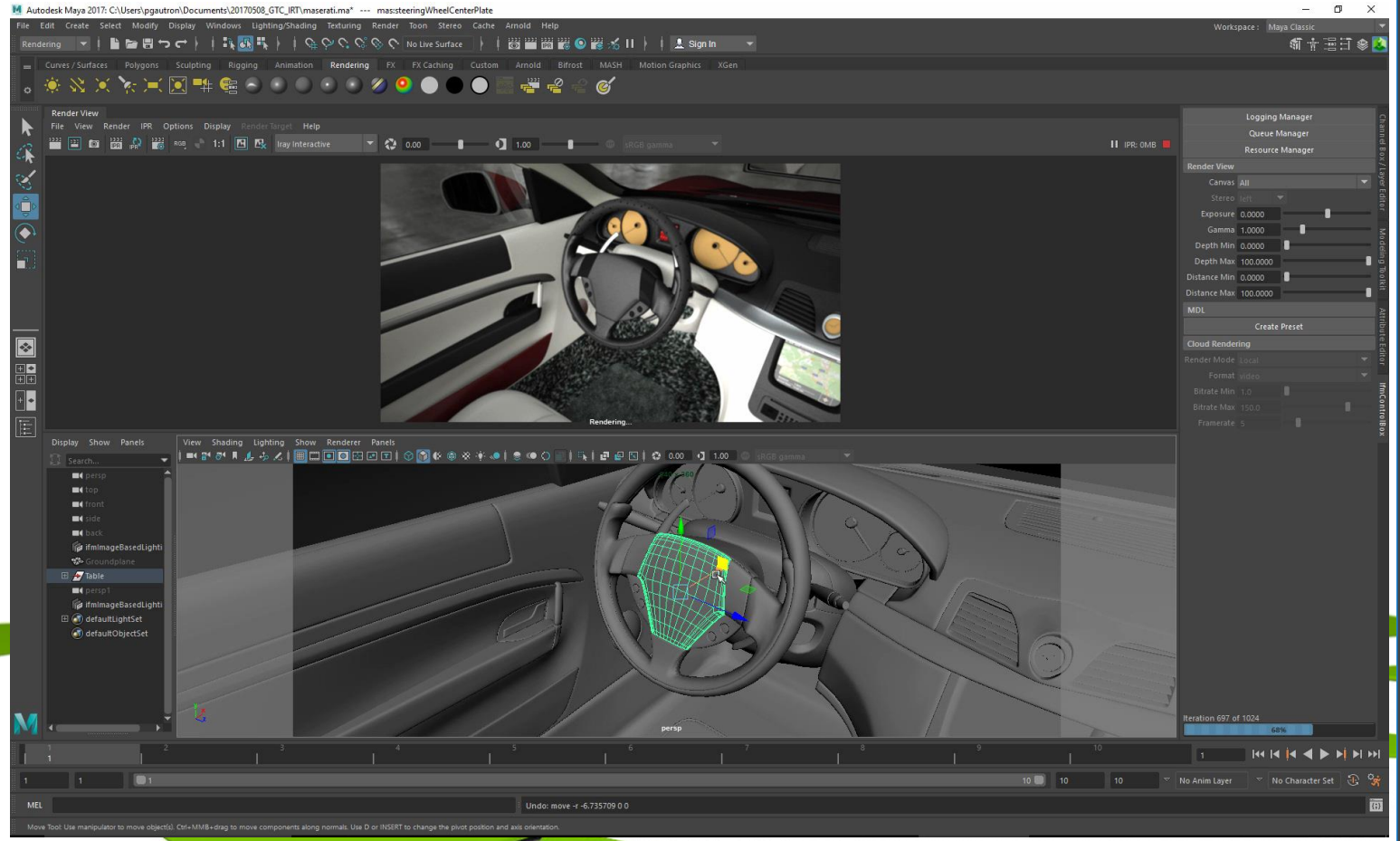
## Flexible Rendering

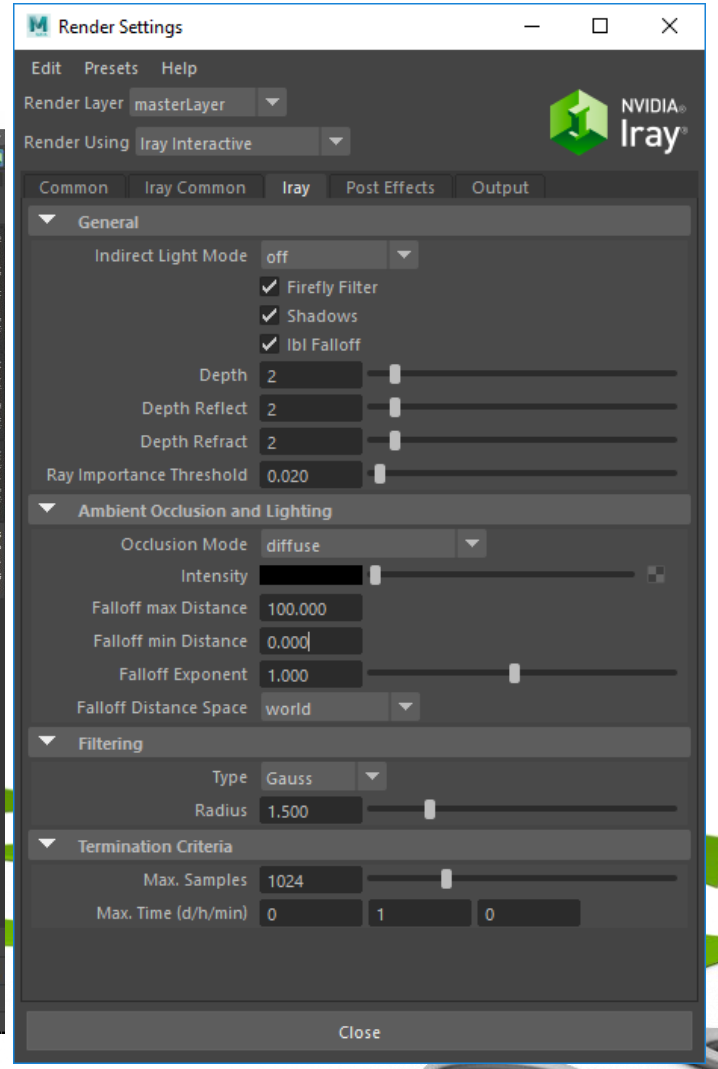

Modeling/Review


Interior Layout


Lighting Design

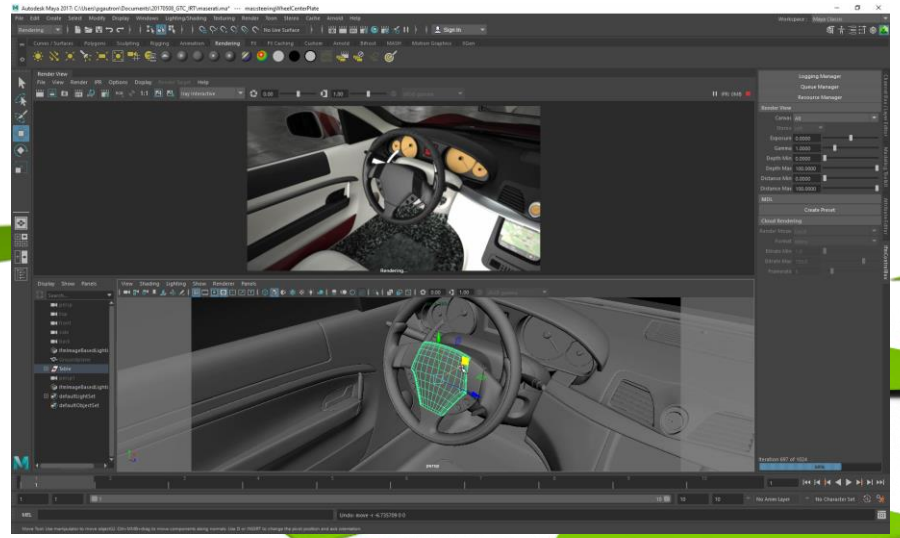

# MODELING/REVIEW



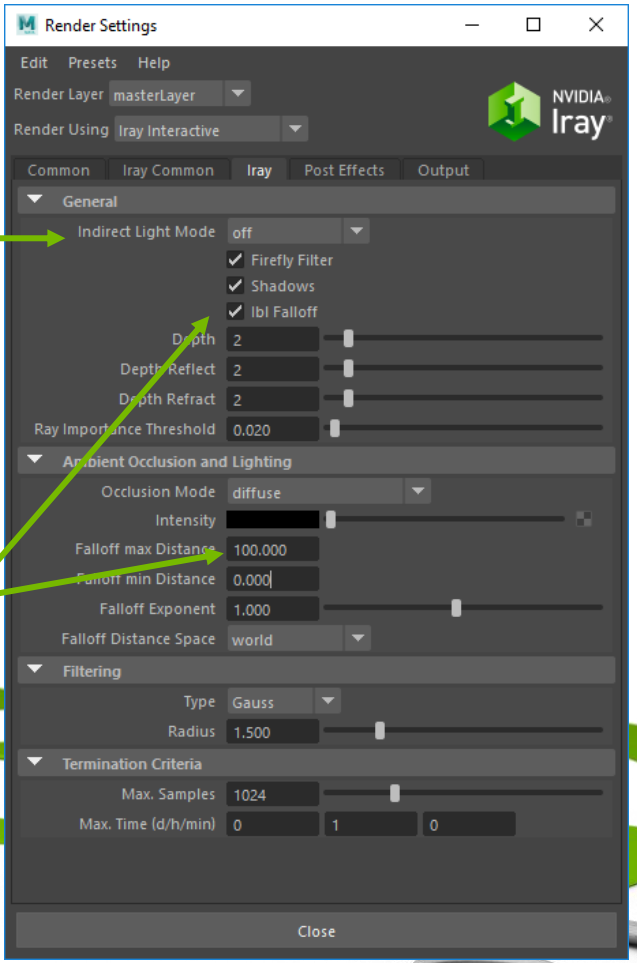
# MODELING/REVIEW

Key Features:
- Dynamic scene updates @10fps
- Instant feedback, converged in ~5s
- 1280x720, NVIDIA Quadro P6000



No indirect lighting

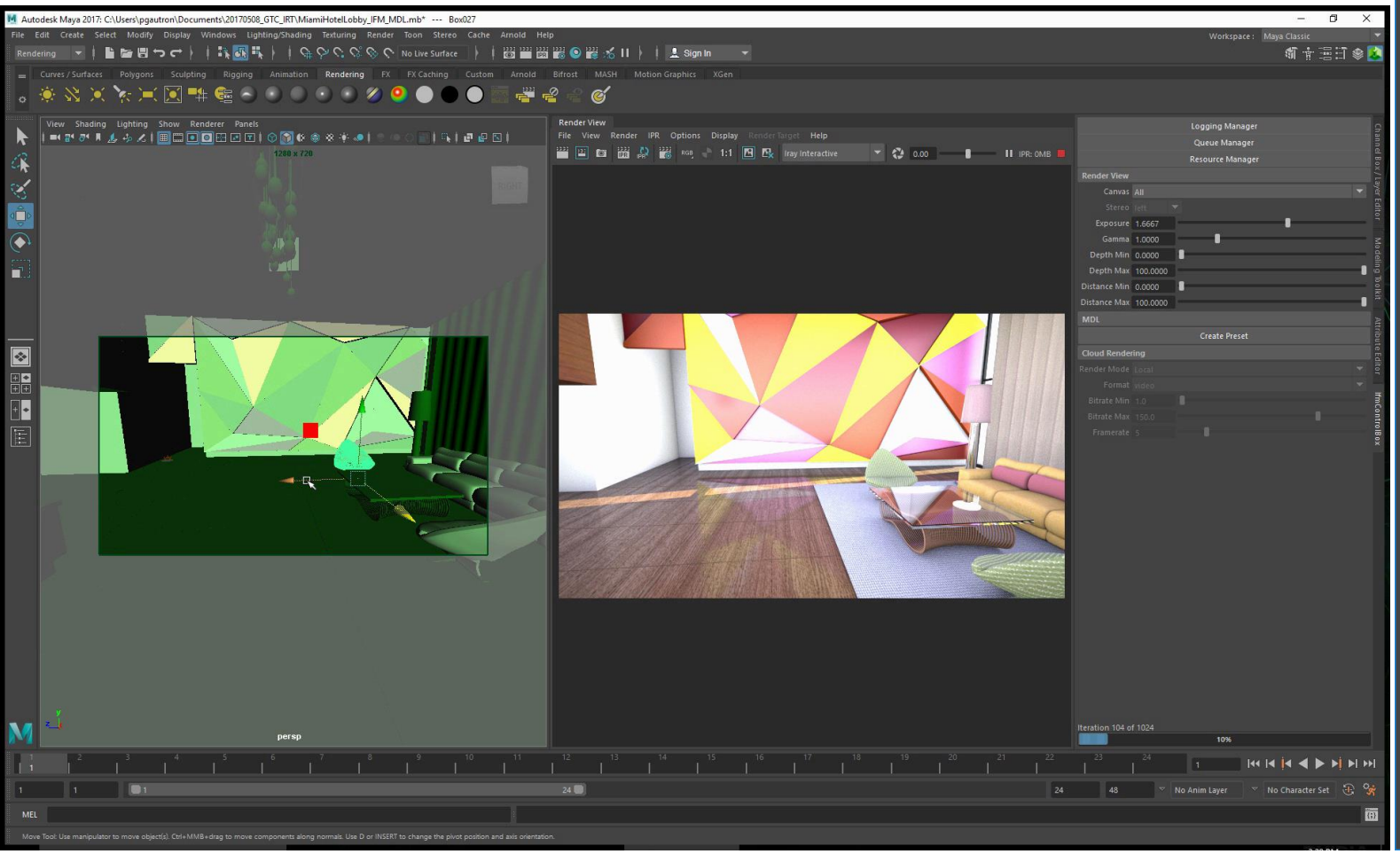
Shadow falloff after 10cm

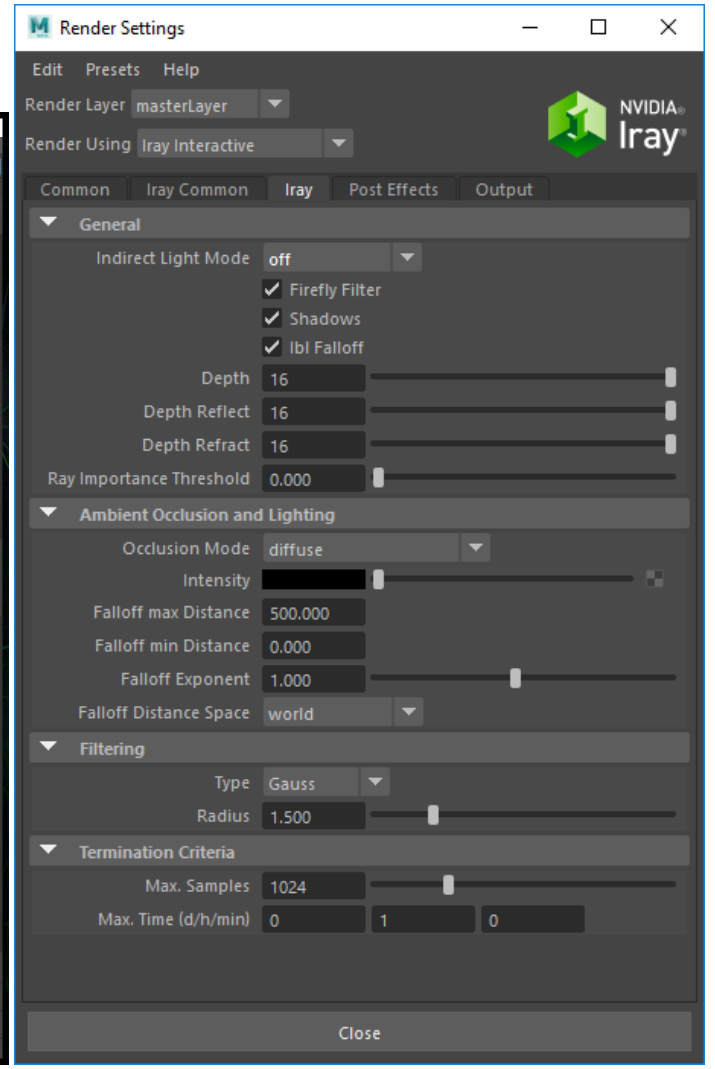


# INTERIOR LAYOUT

## Interacting with Photorealistic Path Tracing

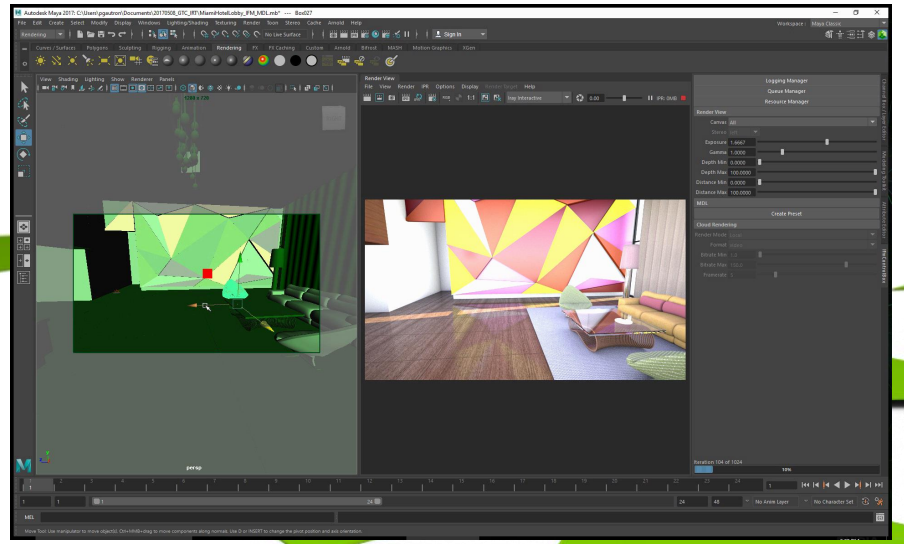
# INTERIOR LAYOUT



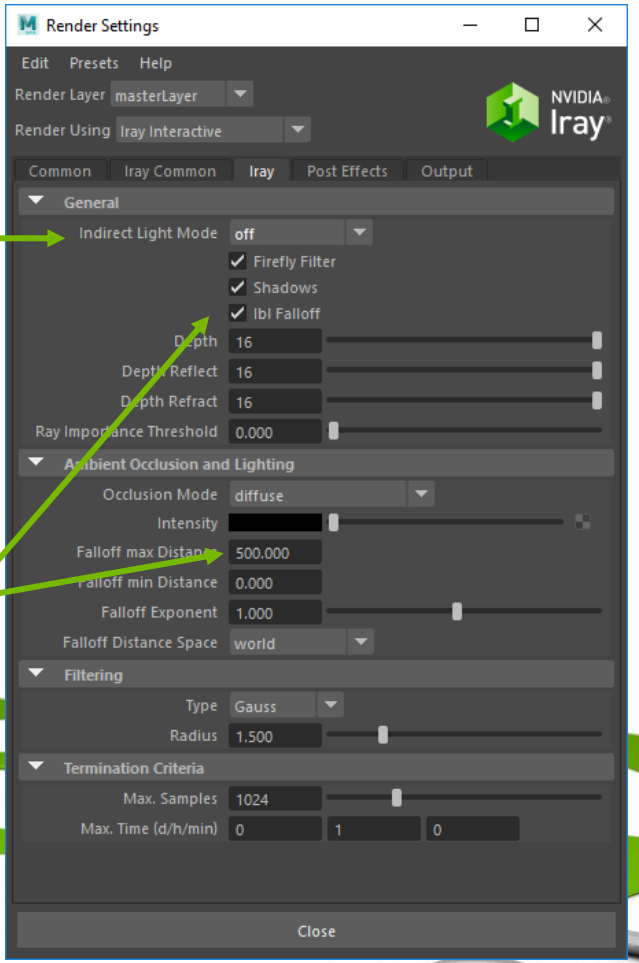
# INTERIOR LAYOUT

Key Features:
- Dynamic scene updates @8.5fps
- Instant feedback, converged in ~10s
- 1280x720, NVIDIA Quadro P6000

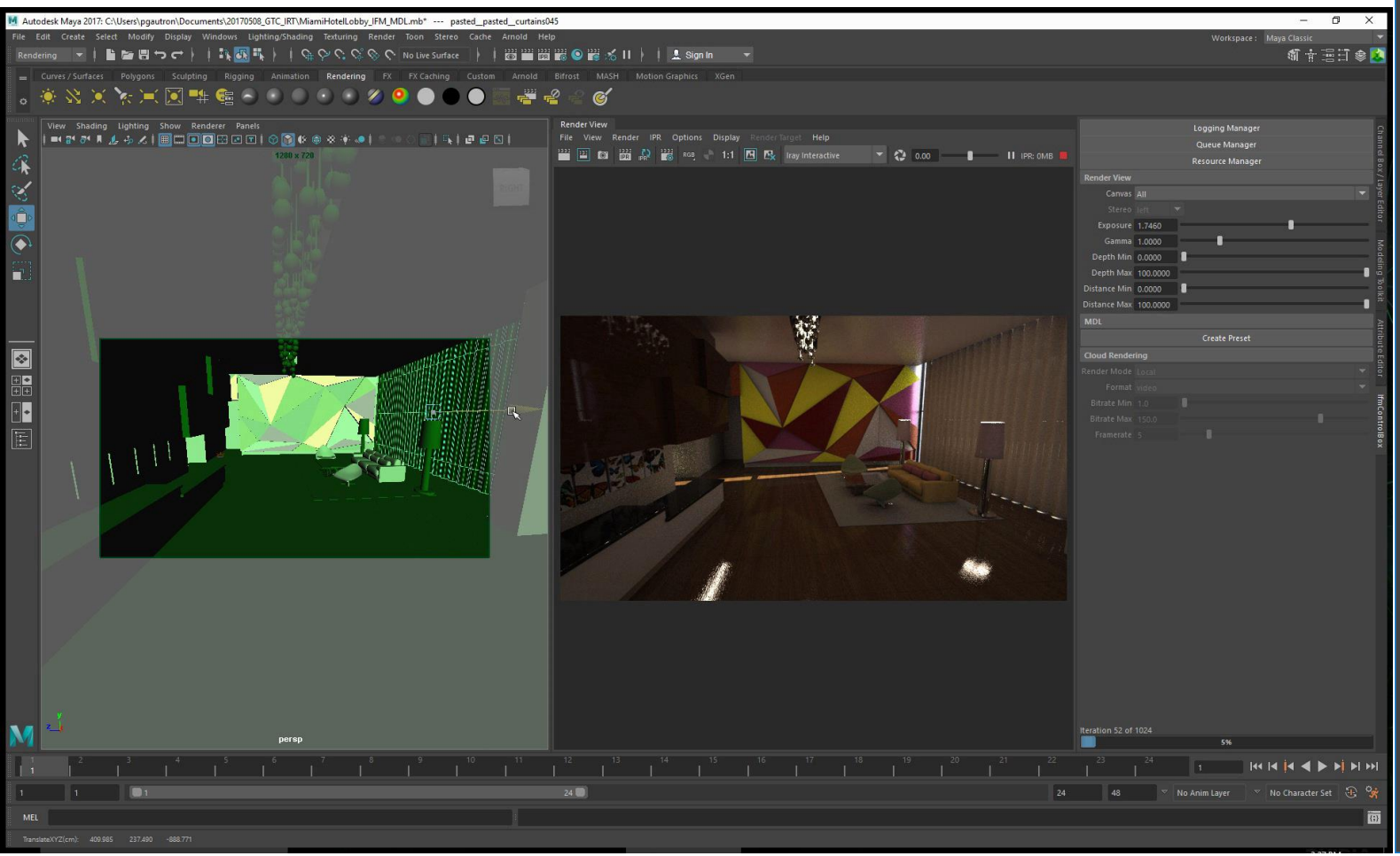


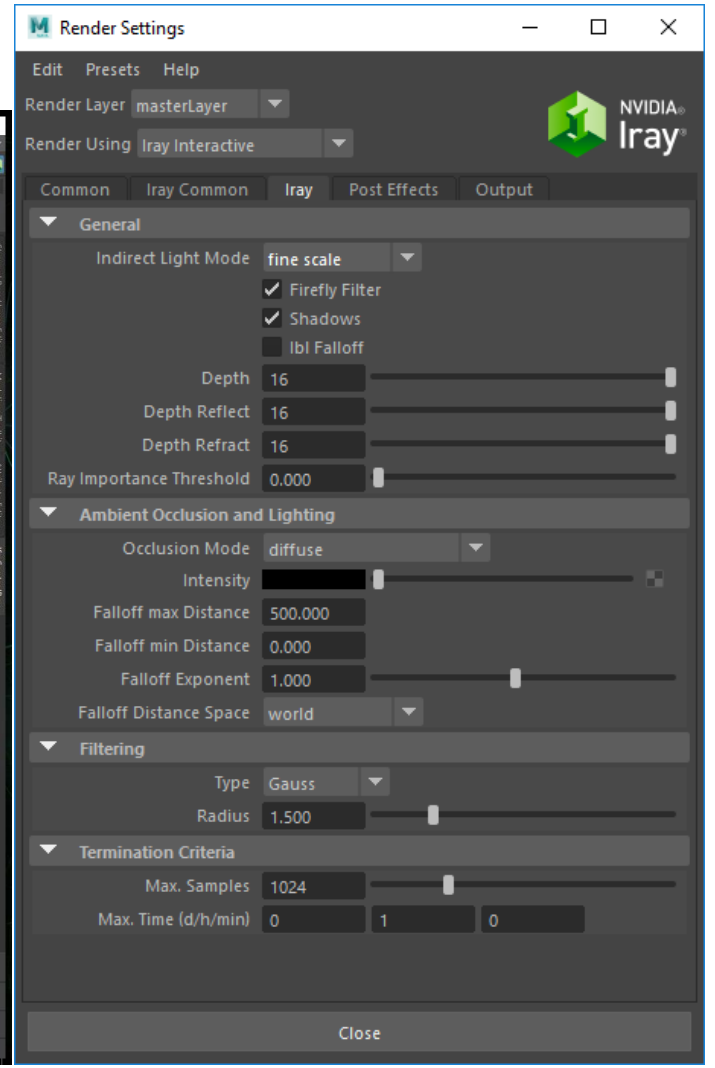
No indirect lighting

Shadow falloff after 50cm



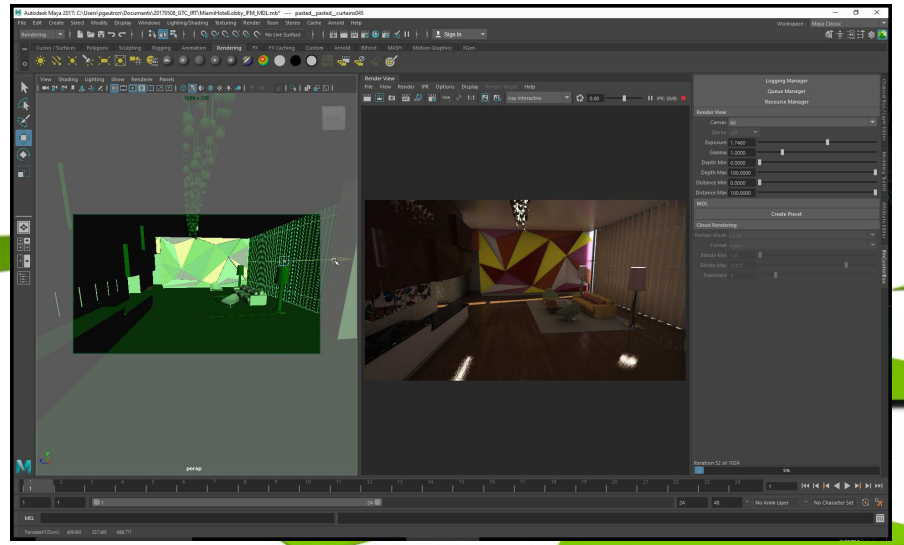
# LIGHTING DESIGN



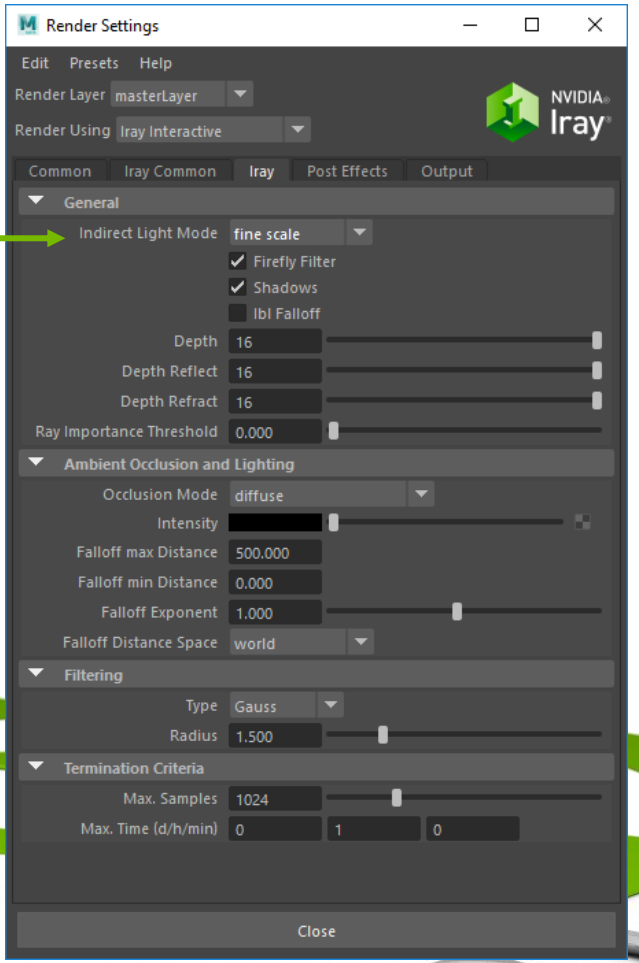
# LIGHTING DESIGN

Key Features:
- Dynamic scene updates @4.5fps
- **Physically plausible solution**, converged in ~4min
- 1280x720, NVIDIA Quadro P6000



Full indirect lighting

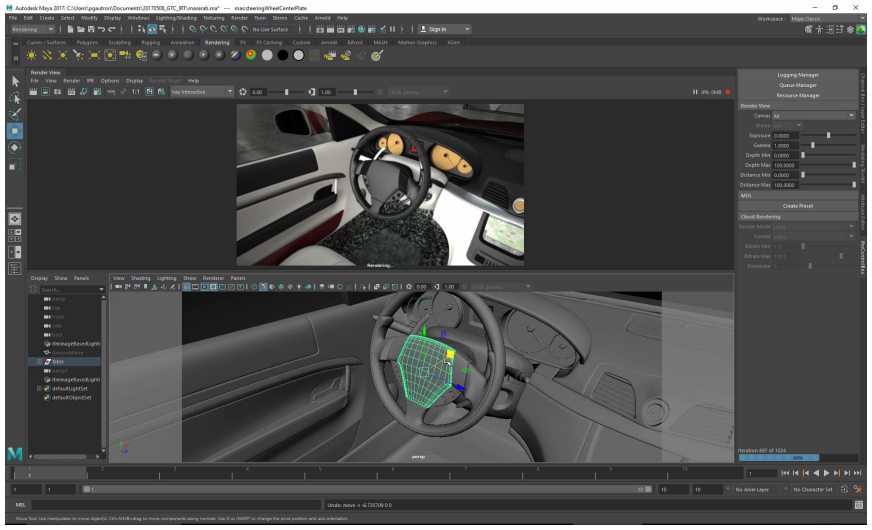
Other approximations ignored



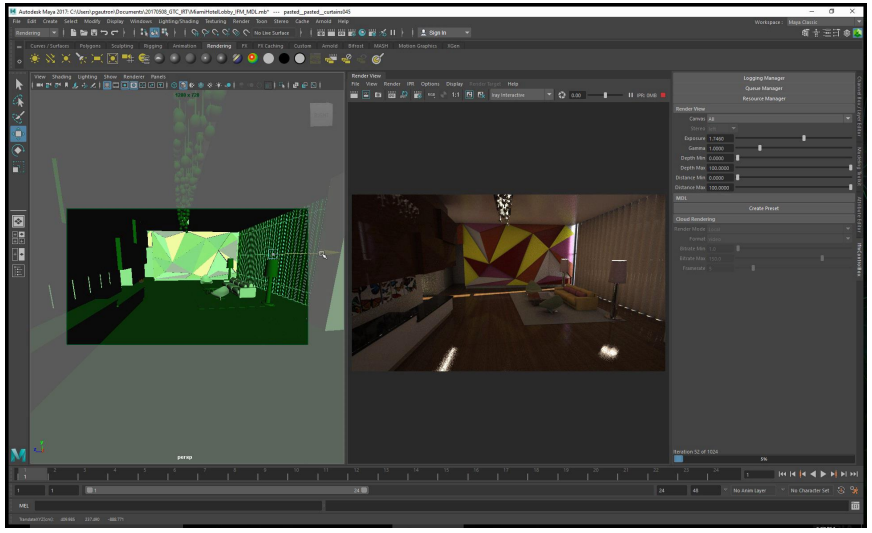
# IRAY FOR MAYA

## Interactive

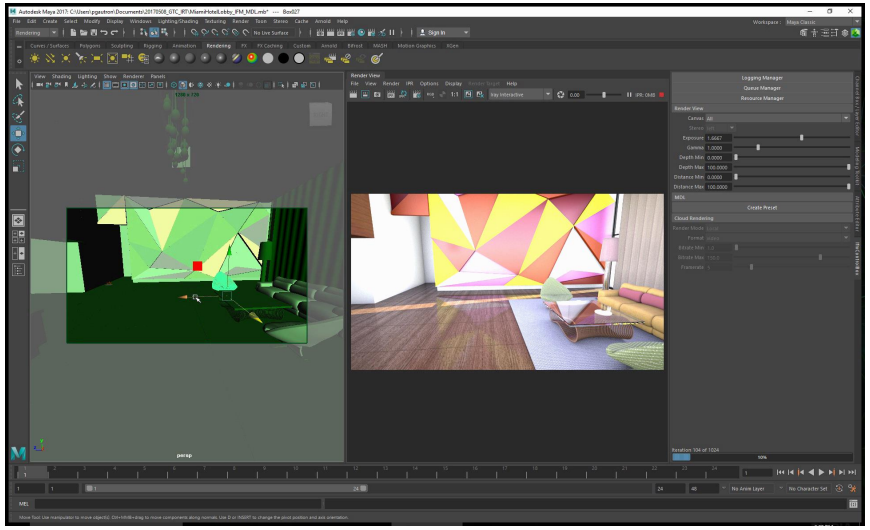
Modeling



Lighting



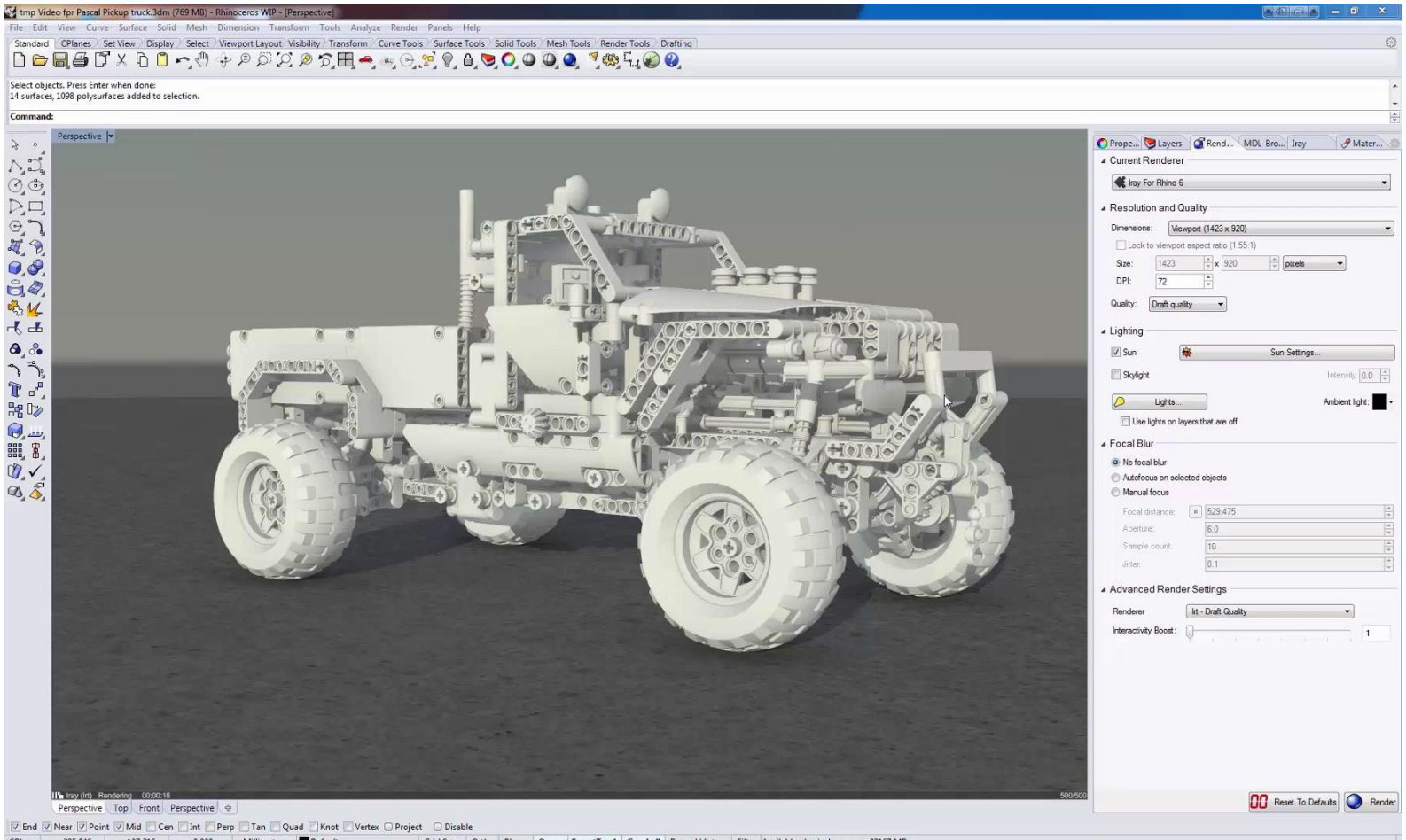
Layout



# IRAY FOR RHINO

Irt Draft

Irt Production



# INTERIOR LAYOUT WITH HOMEBYME

DASSAULT SYSTEMES | The 3DEXPERIENCE® Company

Push-button rendering for end users

Beautiful

Fast

Easy

Affordable

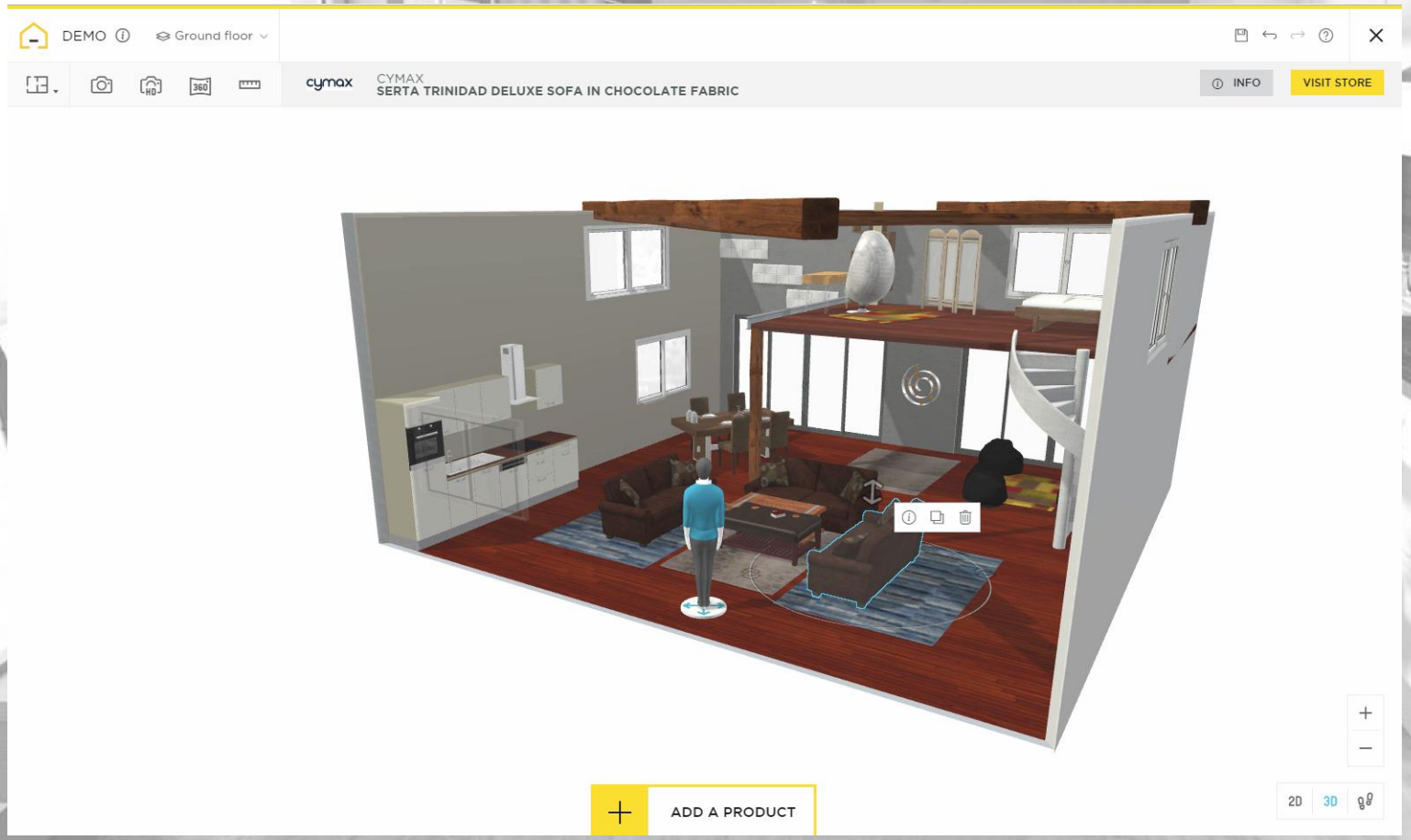
amazon web services

Homebyme

NVIDIA

# INTERIOR LAYOUT WITH HOMEBYME

## Web Interface




Homebyme

NVIDIA

# INTERIOR LAYOUT WITH HOMEBYME

~5mins

4xGrid K520

# INTERIOR LAYOUT WITH HOMEBYME

~5mins

4xGrid K520

# INTERIOR LAYOUT WITH HOMEBYME

Iray Interactive

~5mins

4xGrid K520

Homebyme

NVIDIA

# INTERIOR LAYOUT WITH HOMEBYME

Iray Interactive


~5mins

4xGrid K520

Homebyme

NVIDIA.

# 360/VR RENDERING

## Iray Interactive

Resolution: 2 x 4096x2048

~50min

4xGrid K520

# FUTURE WORK: LIGHT BAKING

S7194 - Light Baking With Iray

M-K. Lefrancois – Tuesday, 3:00-3:25pm, Room 230C

DEMO Ground floor

CYMAX SERTA TRINIDAD DELUXE SOFA IN CHOCOLATE FABRIC

INFO VISIT STORE

# COME TO THE HOMEBYME TALK

S7583 - HomeByMe:
How Iray, VCA, deep learning
and VR helps you experience
your new apartment before it is built
A.Patel, J. Merlet
Thursday, 9:00-9:50, room 230C

ADD A PRODUCT

# DESIGN WITH SOLIDWORKS VISUALIZE

Fast, Easy, Fun

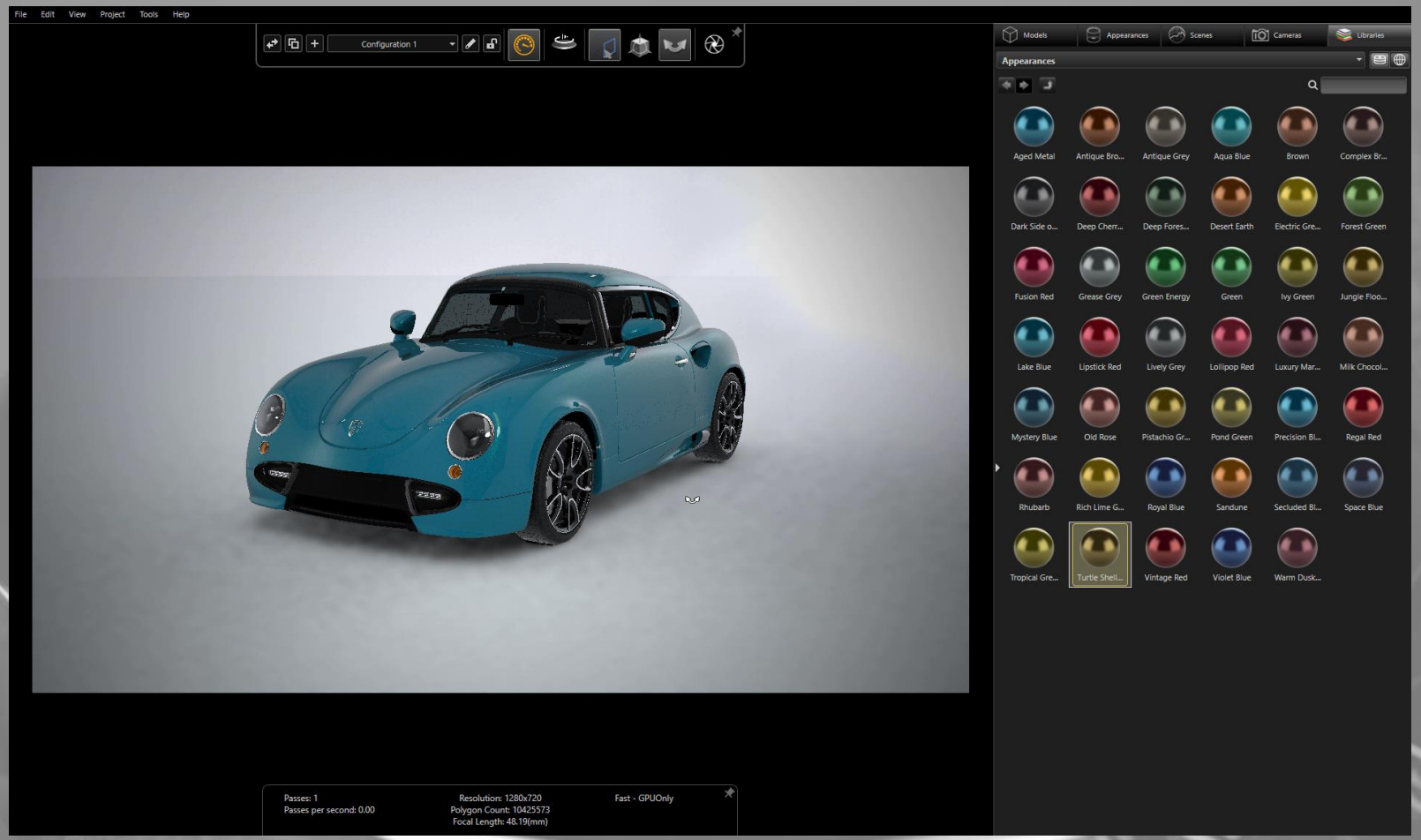

SOLIDWORKS | Visualize

Model credit: Kieron Dunk on TurboSquid

NVIDIA

# DESIGN WITH SOLIDWORKS VISUALIZE

## Medium Quality




SOLIDWORKS | Visualize

Model credit: Kieron Dunk on TurboSquid

Model courtesy of PGO Automobiles

NVIDIA

# DESIGN WITH SOLIDWORKS VISUALIZE

## High Quality


SOLIDWORKS | Visualize

Model credit: Kieron Dunk on TurboSquid

Model courtesy of PGO Automobiles

NVIDIA

# DESIGN WITH SOLIDWORKS VISUALIZE

## Iray Photoreal

SOLIDWORKS | Visualize

Model credit: Kieron Dunk on TurboSquid

Model courtesy of PGO Automobiles

NVIDIA

# DESIGN WITH SOLIDWORKS VISUALIZE

Fast Medium Quality

Fast High Quality

Accurate

SOLIDWORKS | Visualize

Model credit: Kieron Dunk on TurboSquid

Model courtesy of PGO Automobiles

NVIDIA

# IRAY INTERACTIVE

Iray for Maya


Homebyme

# WHAT'S COMING?

# MANY LIGHTS

Up to 1M lights

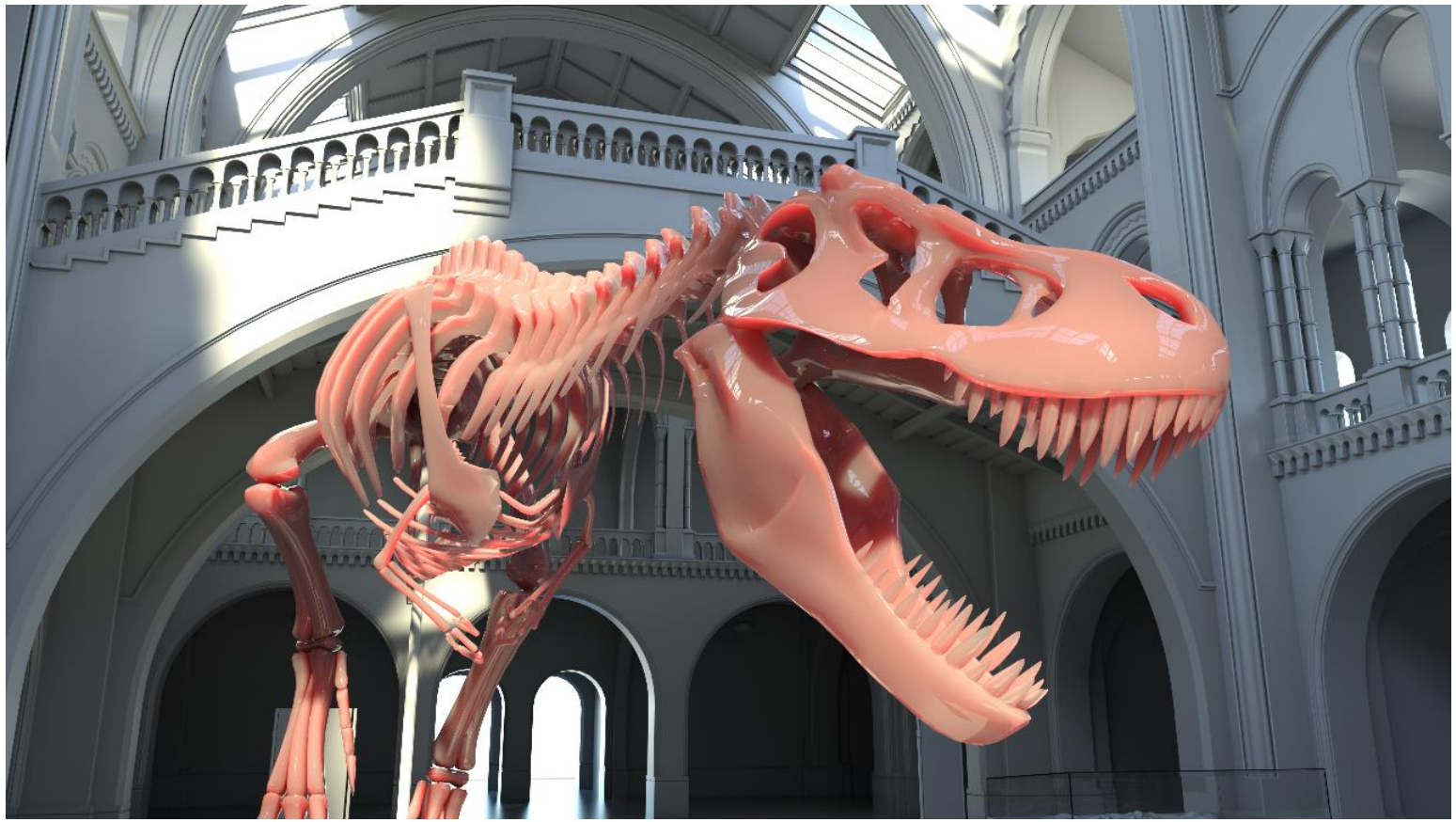
LA by Night – 23000 light sources – 30s on M6000


NVIDIA Campus – 5300 light sources – 4 mins on 2x K6000

Coming in Iray for Maya 2017

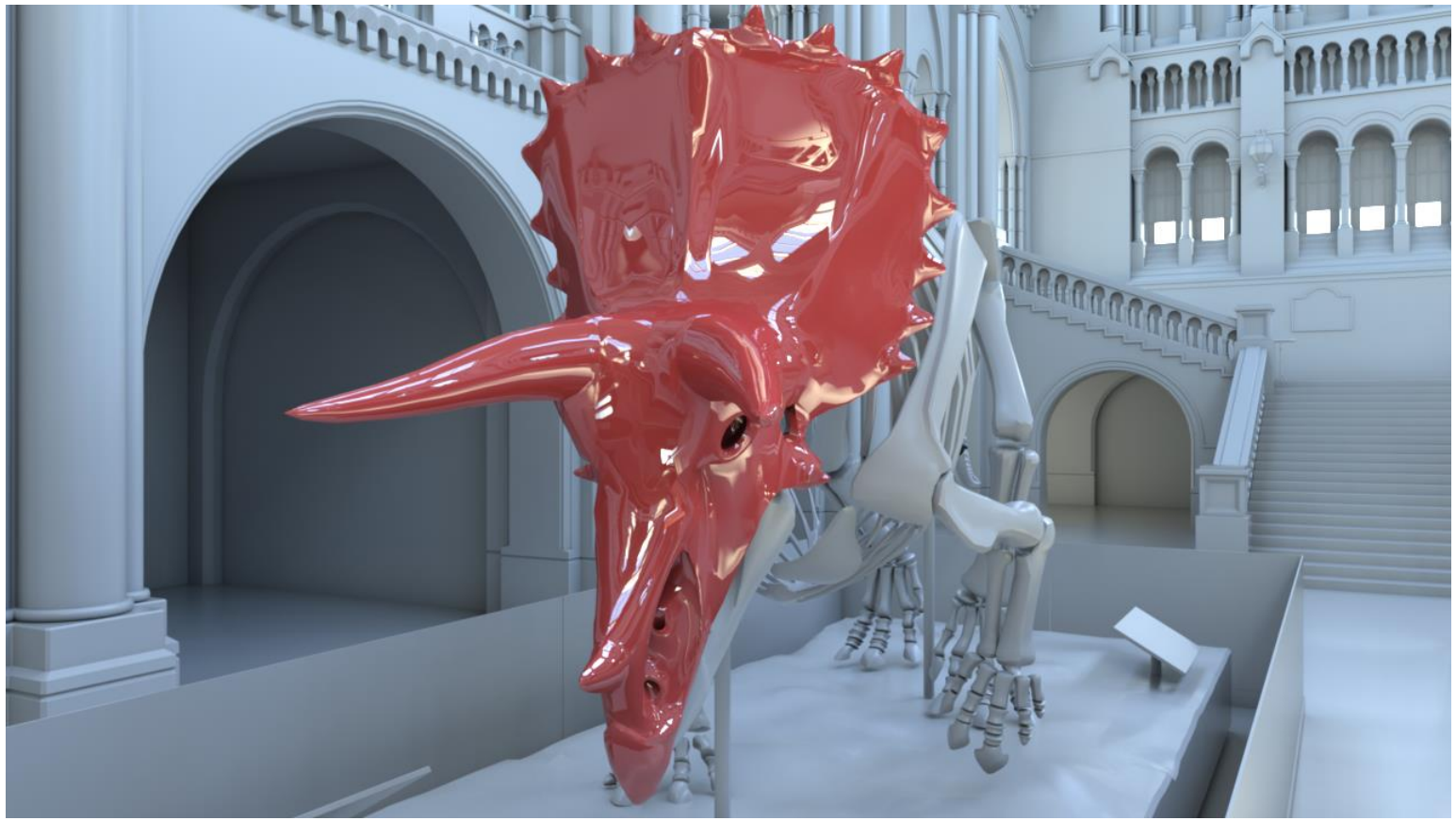
# SUBSURFACE SCATTERING

## Fast SSS Approximation



Coming in Iray for Maya 2017

# CUTOUT OPACITY



# FASTER FINAL IMAGES

## Optimized Sampling

Focus on solving visibility

Higher GPU efficiency

~30% faster to final frame

# FASTER FINAL IMAGES

## Batch Scheduling

Several iterations at once

Higher GPU efficiency

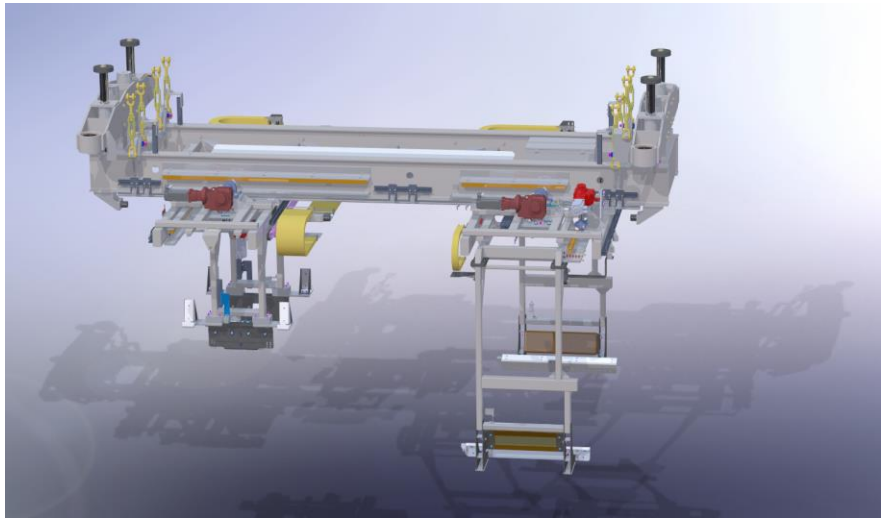
interactive

Time

batch

# IRAY INTERACTIVE

## Locally



SOLIDWORKS | Visualize

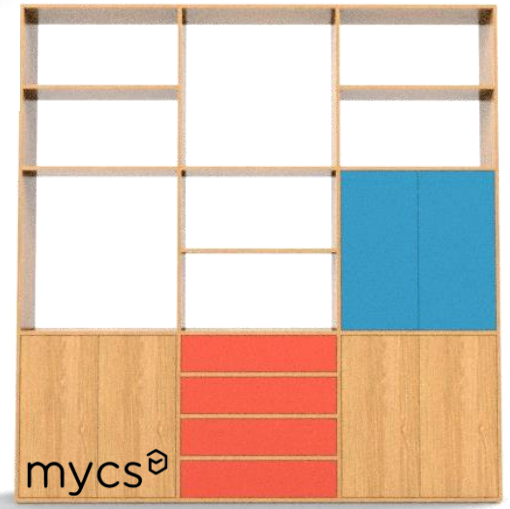




NVIDIA.

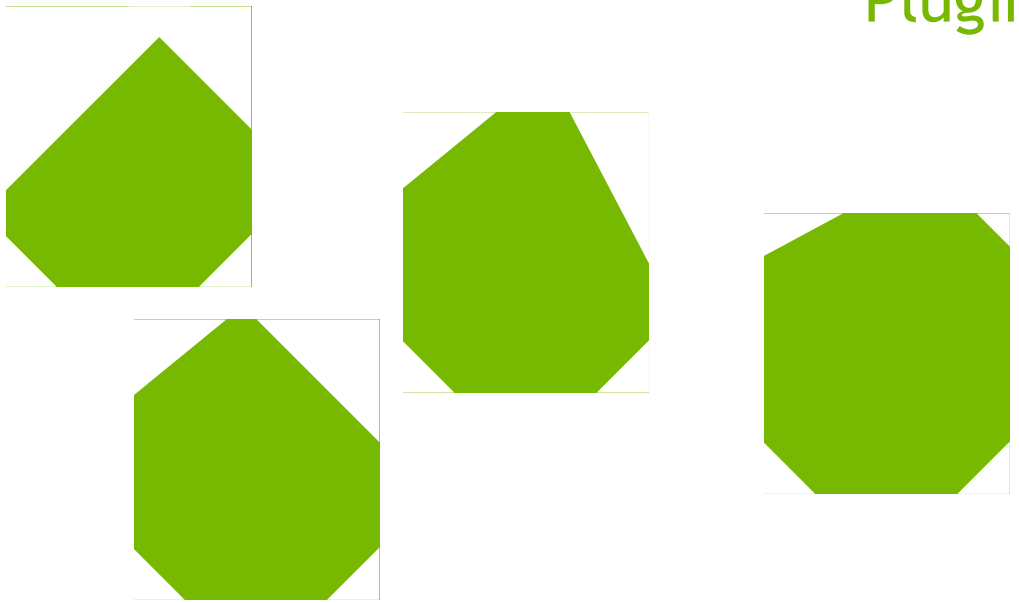
# IRAY INTERACTIVE

## On the Cloud

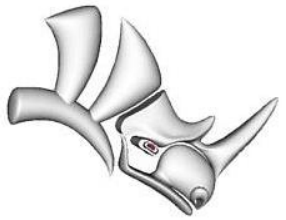




# NVIDIA IRAY

## Plugins

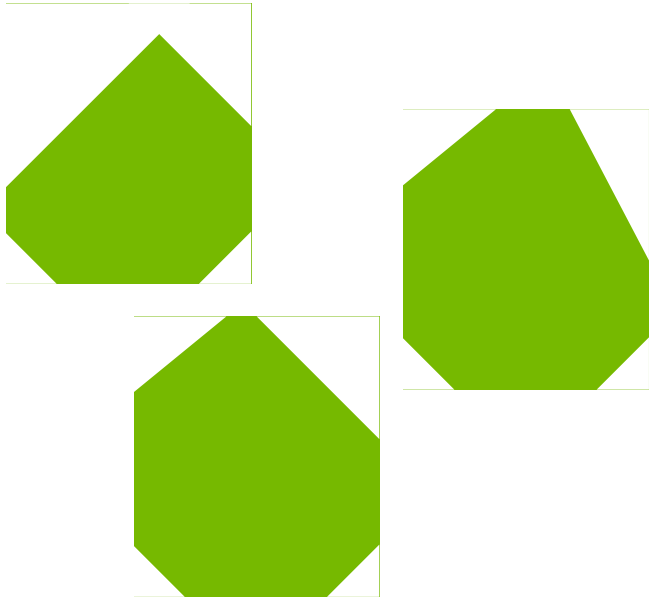






# IRAY INTERACTIVE

## Integrations



Homebyme

mycs

CATIA

SOLIDWORKS | Visualize

## Make your own!

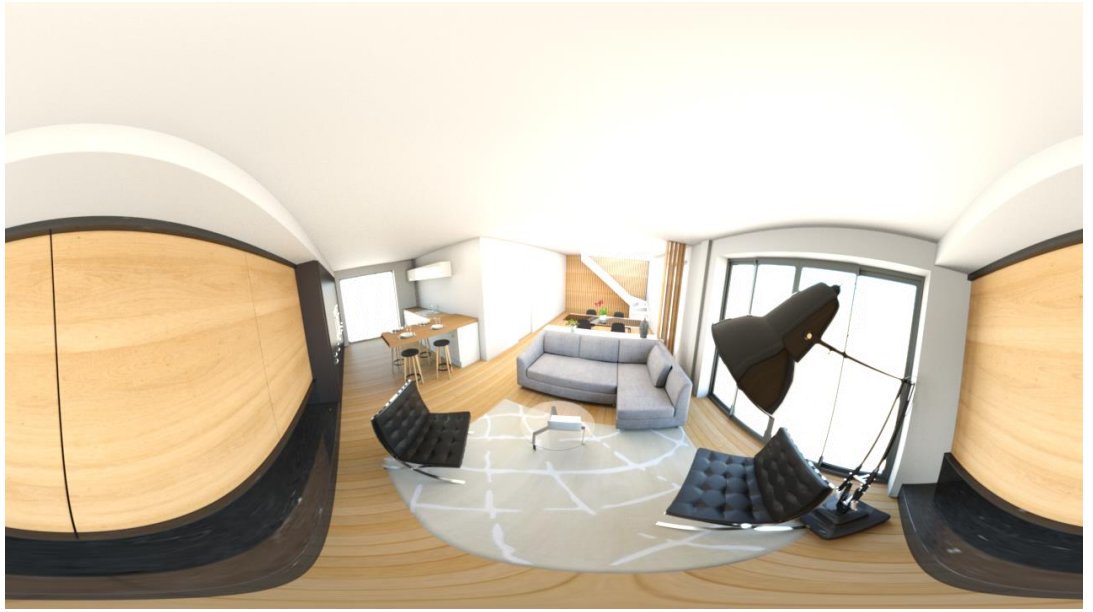
irt_ambient_occlusion_mode
shadow_terminator_offset_mode
filter
radius
irt_environment_occlusion_scale
irt_env_approx_color
irt_env_lighting_mode
irt_ambient_intensity
irt_use_ambient_occlusion
irt_ambient_falloff_max_distance
irt_ambient_falloff_min_distance
irt_ambient_falloff
depth_reflect
depth_refract
depth
depth_shadow
irt_shadows
irt_ibl_falloff
irt_ambient_falloff_distance_space
irt_first_frame_antialiasing
irt_area_as_point_lights
irt_ambient_shadow_mode
irt_ssibl_cutoff
irt_ray_importance_threshold
irt_filter_sigma
irt_indirect_light_mode
irt_indirect_light_mis_mode
irt_indirect_outlier_rejection
irt_env_scale_bias
irt_psf_lighting_filter
irt_psf_geometry_filter
irt_psf_convergence_frame
irt_psf_enable
iray_bloom_filtering
iray_bloom_filtering_radius
iray_bloom_filtering_threshold
iray_bloom_filtering_brightness_scale
progressive_rendering_max_time
progressive_rendering_max_samples
irt_fast_convergence_start
matte_shadow_affects_alpha
matte_remap_uv_to_dome_in_aux_canvas
iray_firefly_filter
iray_nominal_luminance
irt_refract_backplate
irt_refract_backplate_blend_zone
irt_glossy_ground_resolution
iray_environment_resolution_y
irt_environment_max_resolution
matte_visible_in_aux_canvas



NVIDIA.

# PHOTOREAL OR INTERACTIVE?

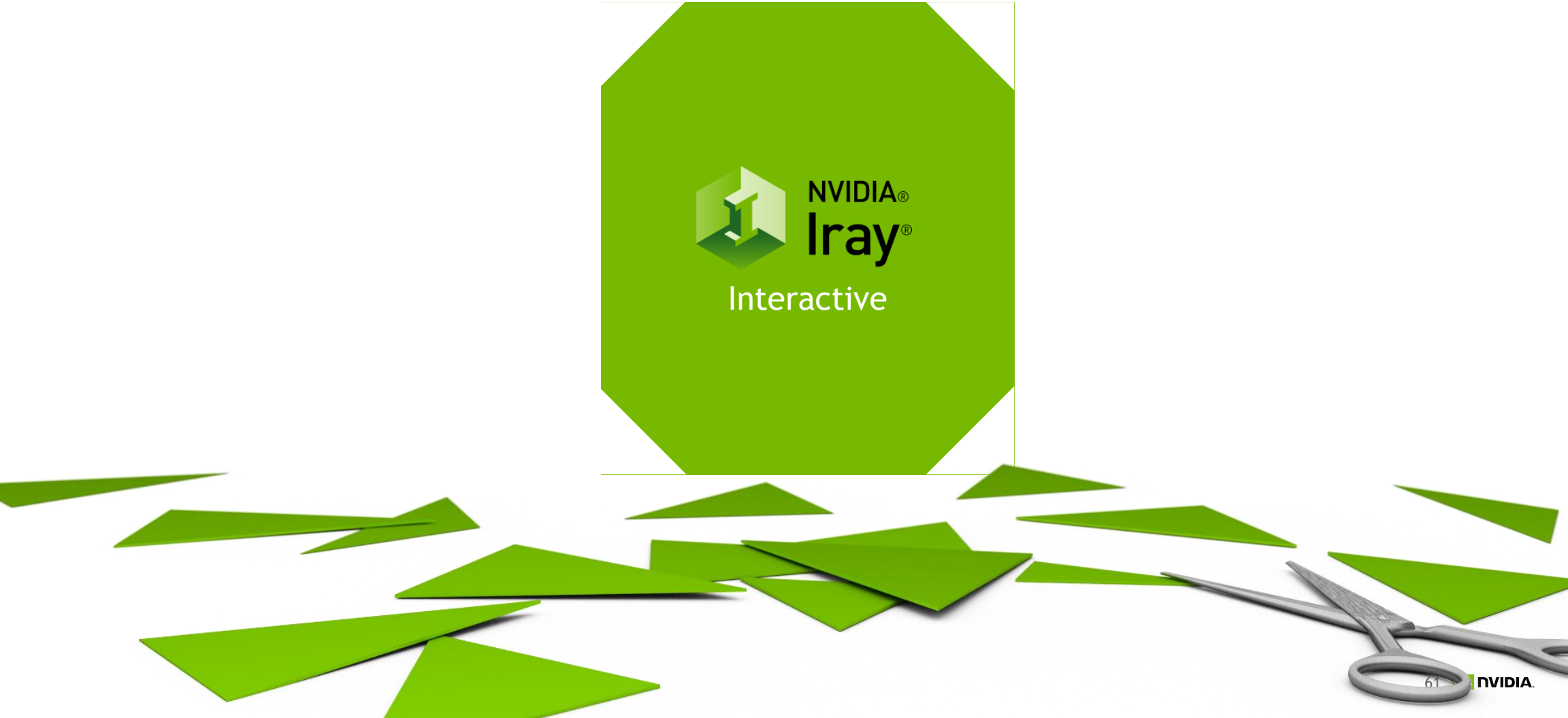
Photoreal



Interactive

NVIDIA® Iray®

# MAKE IT YOURS!



# UPCOMING IRAY @ GTC

**S7810 - Acceleration of multi-object detection and classification training process with NVIDIA Iray SDK – Tuesday 3:00-3:50PM – 210A**
**T. Surazhsky - SAP**

**S7351 - Applying GPU technology to combat system integration and maintenance – Wednesday 4:00-4:25PM – 230A**
**R. Rabbitz, C. Crouch - Lockheed Martin**

**H7108 - Connect with the experts: Mental Ray and Iray rendering workflows – Tuesday 11:00-12:00PM – LL Pod A - Thursday 2:00-3:00PM – LL Pod B**
**B. Gawboy, P. de Lappe, J. Axe - NVIDIA**

**S7440 - Create high-quality materials from scans with MDL and Substance – Tuesday 4:00-4:50PM – 230C**
**P. Maheut, J. Derel - Allegorithmic**

**S7583 - HomeByMe: How Iray, VCA, deep learning and VR help you experience your new apartment before it is built – Thursday 9:00-9:50AM – 230C**
**A. Patel - NVIDIA, J. Merlet - 3DVIA/Dassault Systemes**

**S7194 - Light baking with Iray – Tuesday 3:00-3:25PM – 230C**
**M-K. Lefrancois - NVIDIA**

**S7453 - NVIDIA advanced rendering products for end users – Tuesday 2:00-2:50PM – 230C**
**P. Miller - NVIDIA**

**S7328 - The NVIDIA Iray light transport simulation and rendering system – Wednesday 1:00-1:50PM – 230C**
**A. Keller, L. Kettner - NVIDIA**

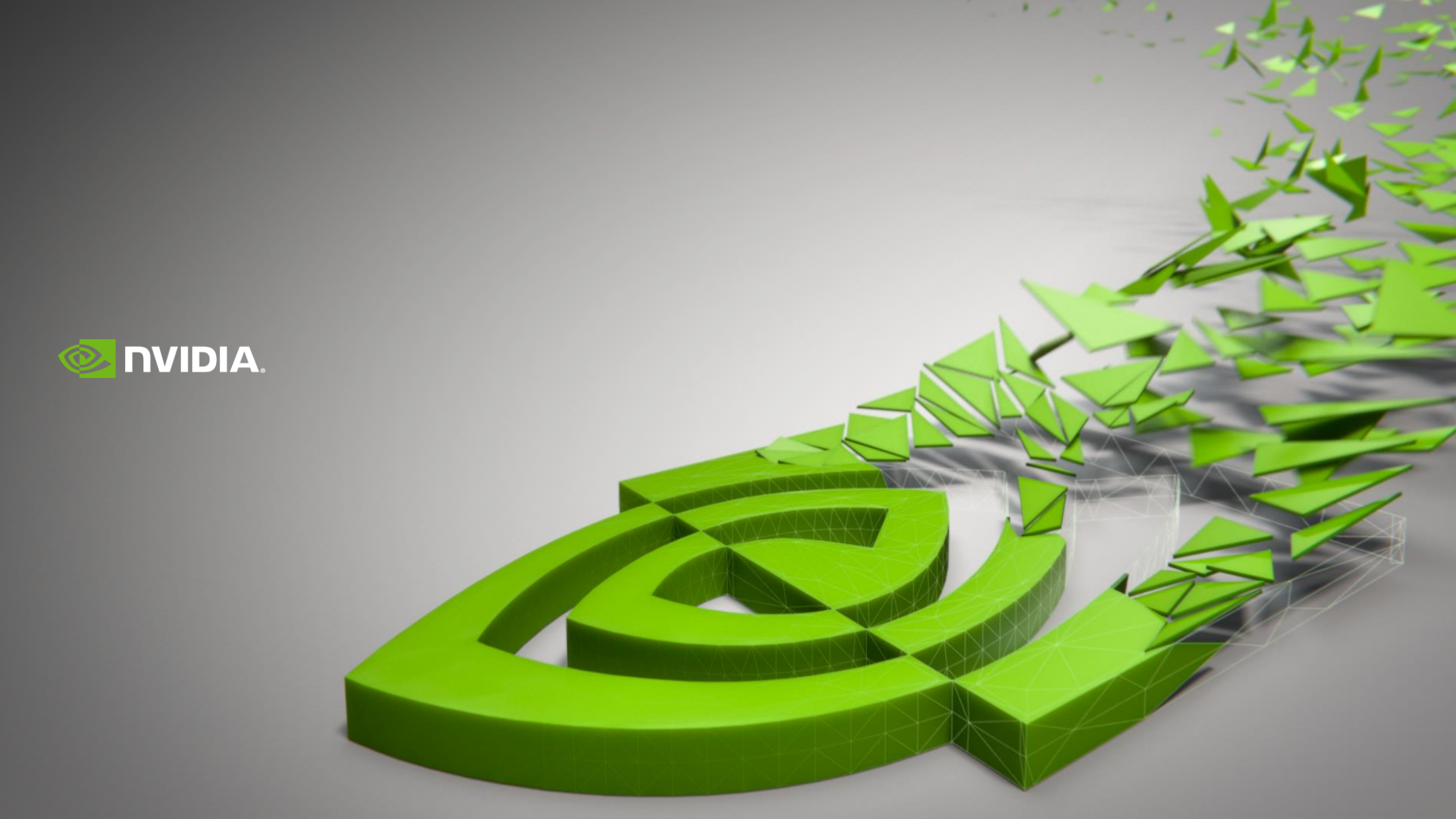

# IRAY INTERACTIVE

## OR HOW TO RENDER AEC INTERIORS FOR REALISTIC STILLS AND VR IN MINUTES

Pascal Gautron, Project Leader

pgautron@nvidia.com

NVIDIA.


NVIDIA