### IRAY INTERACTIVE RAYTRACING INTERIORS FOR STILLS AND VR WITHIN MINUTES

Pascal Gautron, Project Leader

pgautron@nvidia.com





#### PHOTOREALISM IS ALSO COSTLY



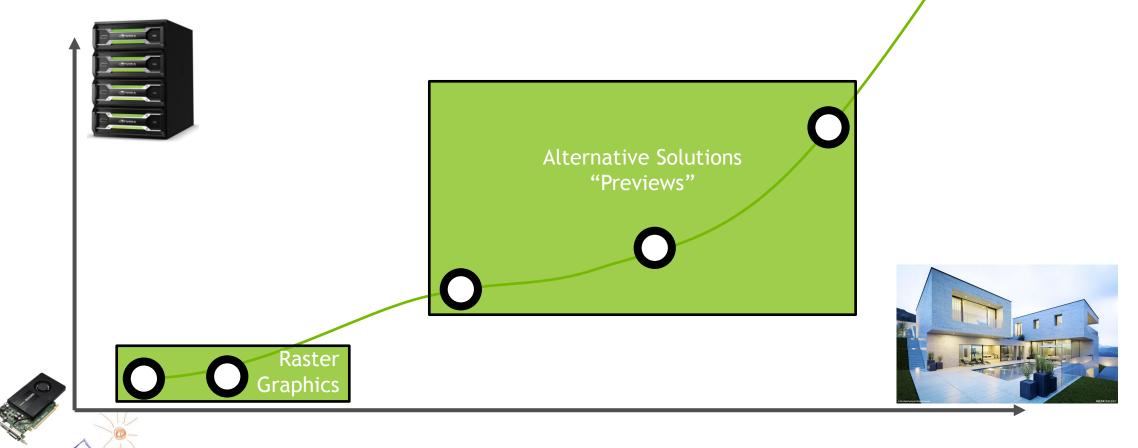
#### **RENDERING SOLUTIONS**

Photorealistic Rendering



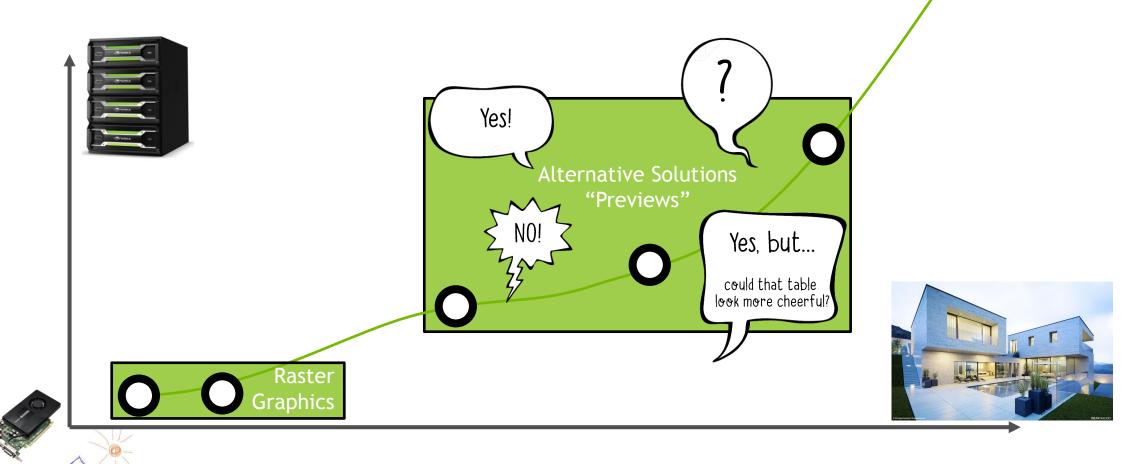


### **TYPICAL DESIGN WORKFLOW**



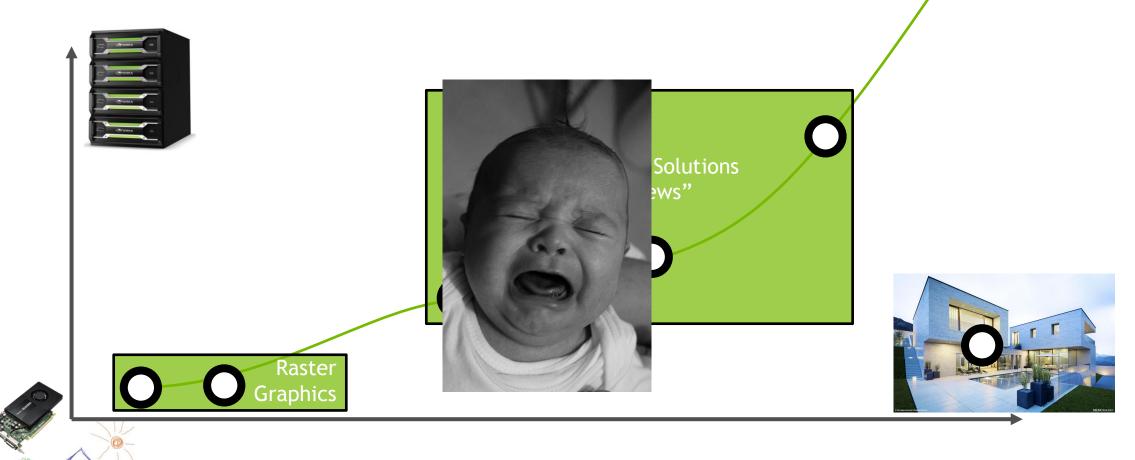


### **TYPICAL DESIGN WORKFLOW**





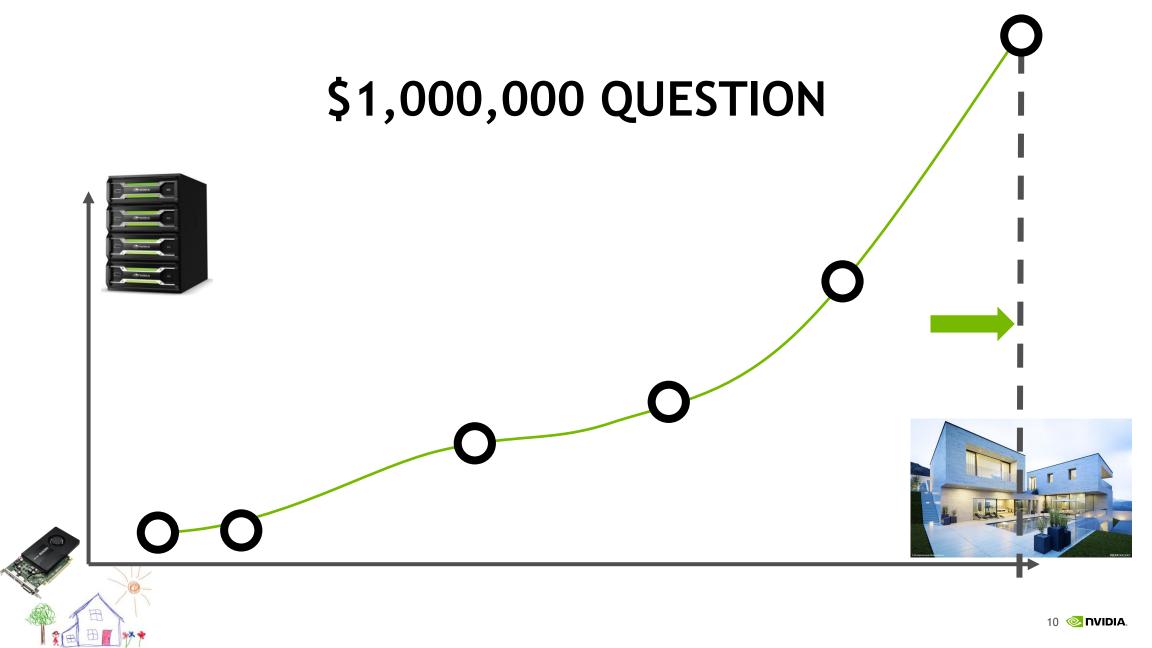
#### **TYPICAL DESIGN WORKFLOW**

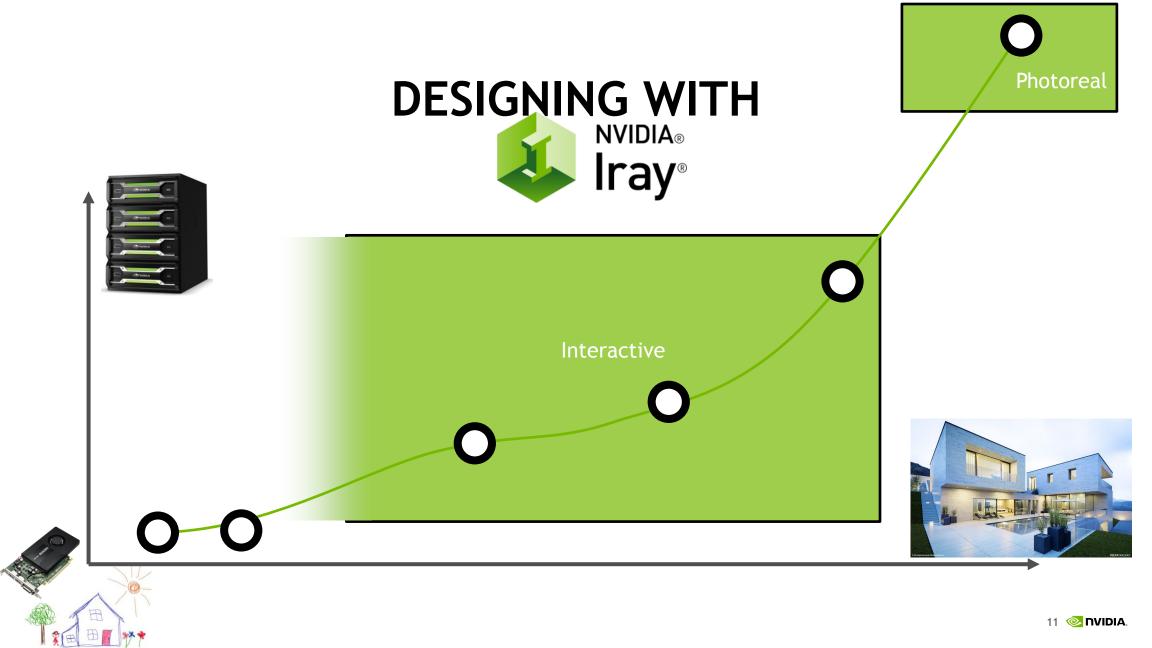


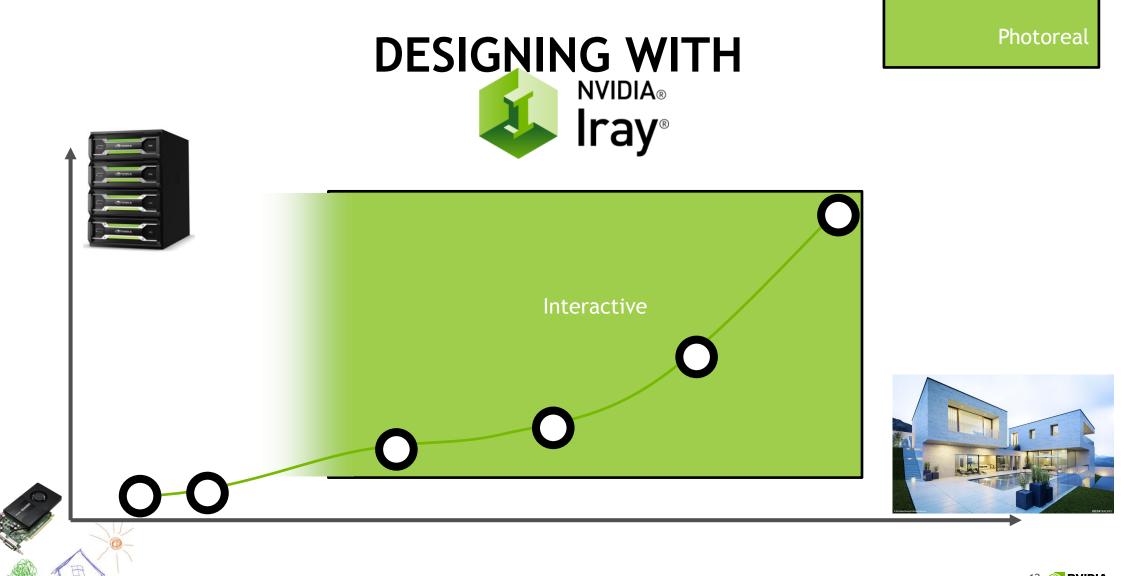


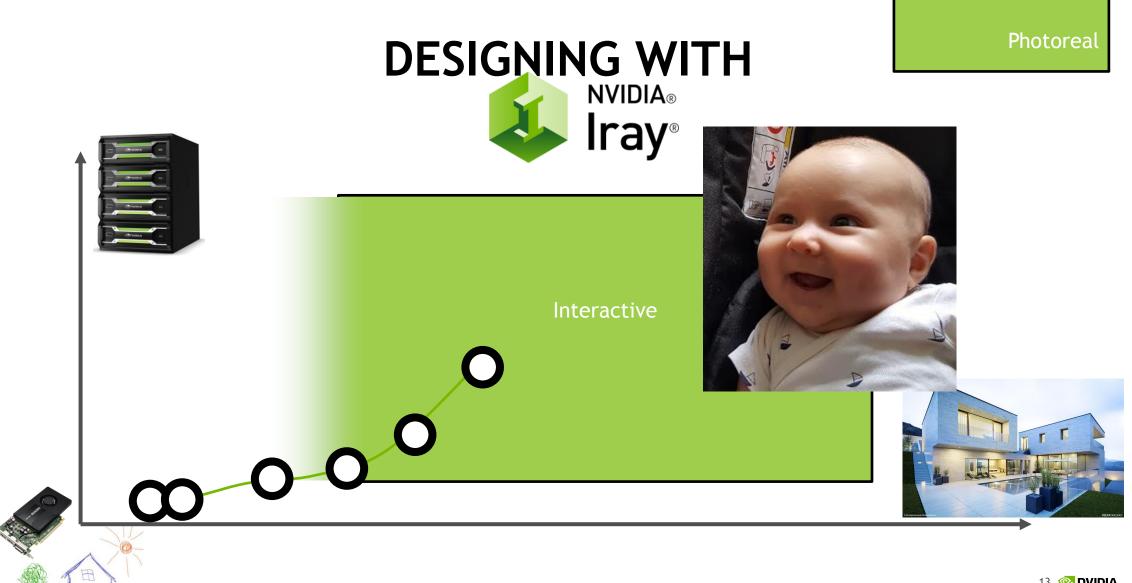
## \$1,000,000 QUESTION







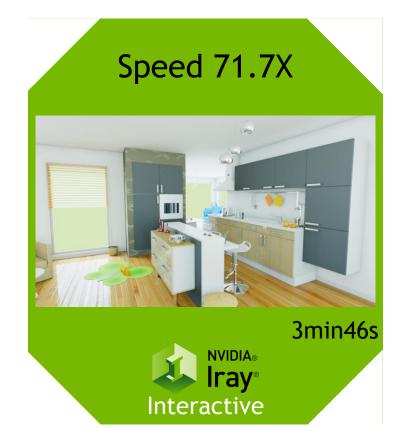






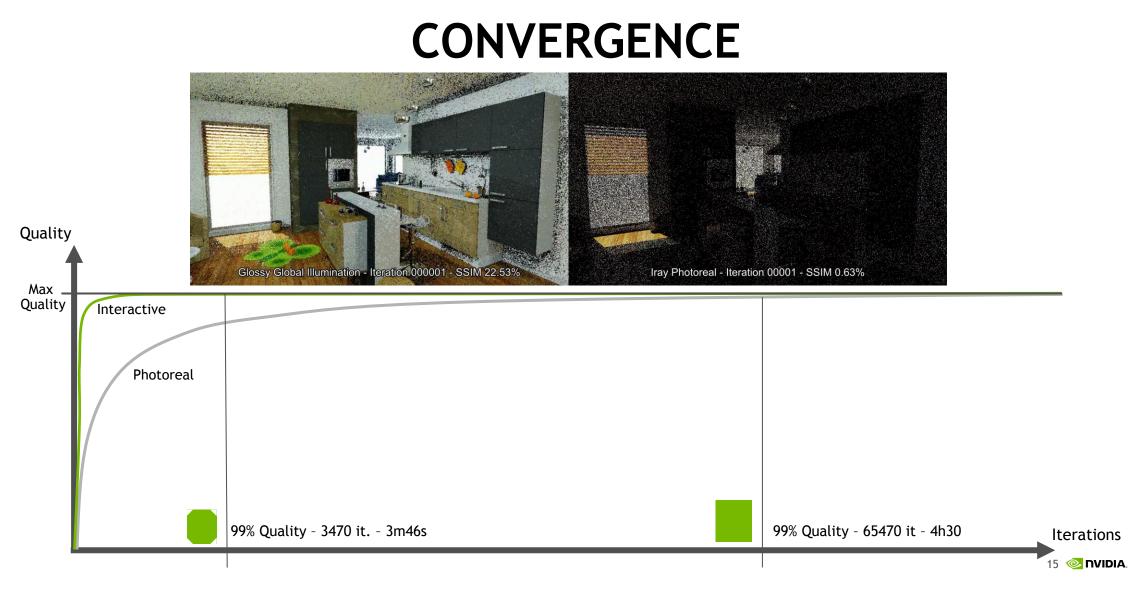
### CONCEPT

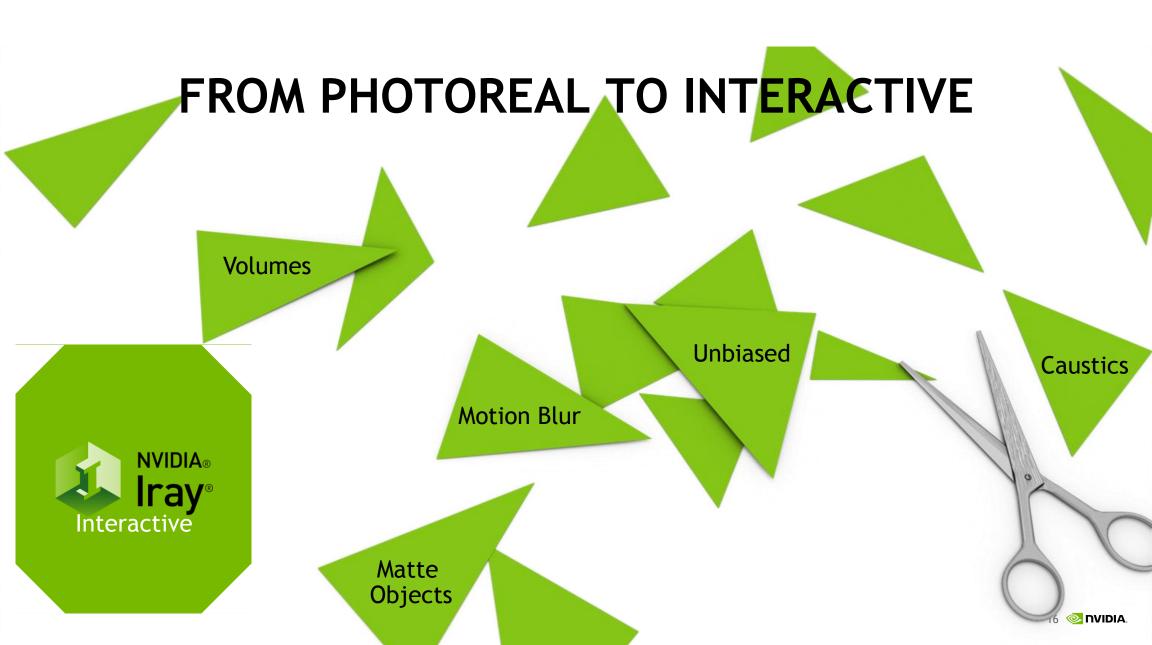


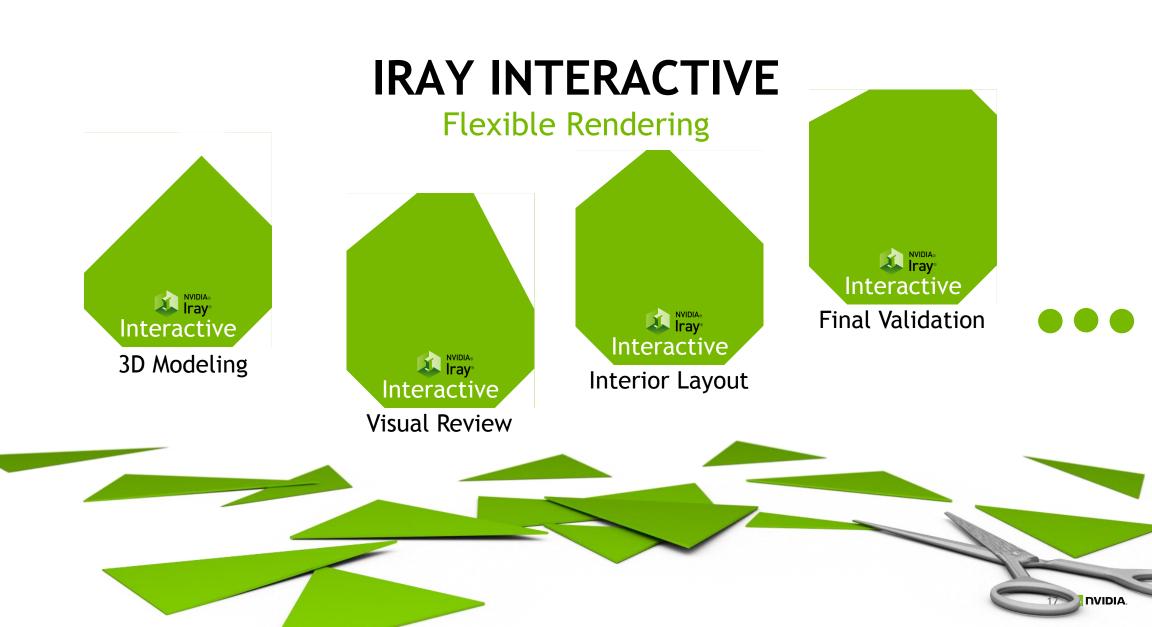


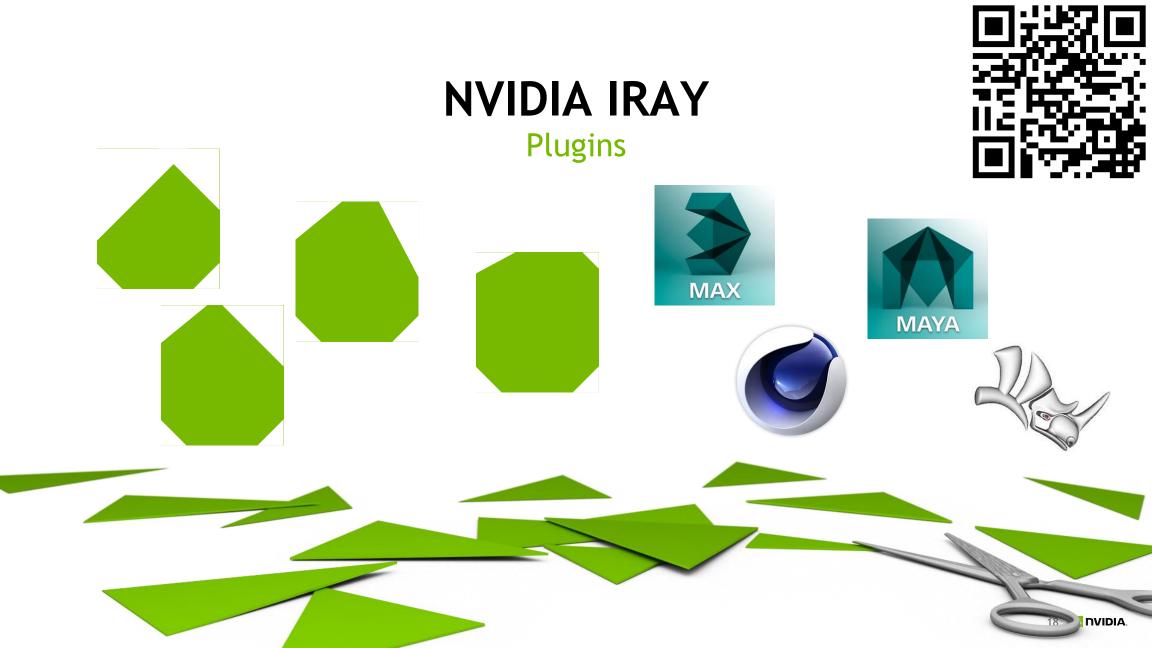
1280x720, Quadro M6000

14 💿 nvidia.



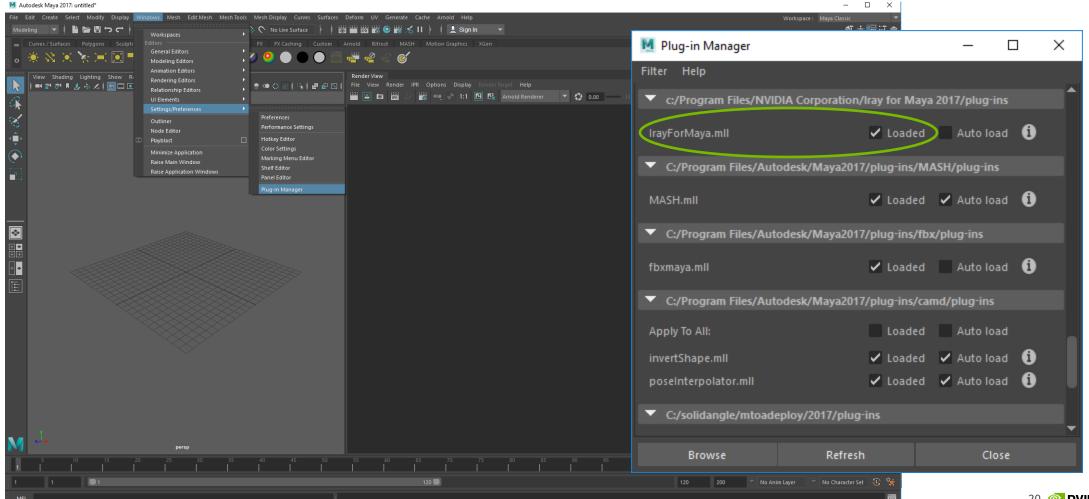








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			Create Preset Cloud Rendering Render Mode Local Format video Bitrate Min 1,0 Bitrate Max 150.0 Framerate 5
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#### **MDL** Materials

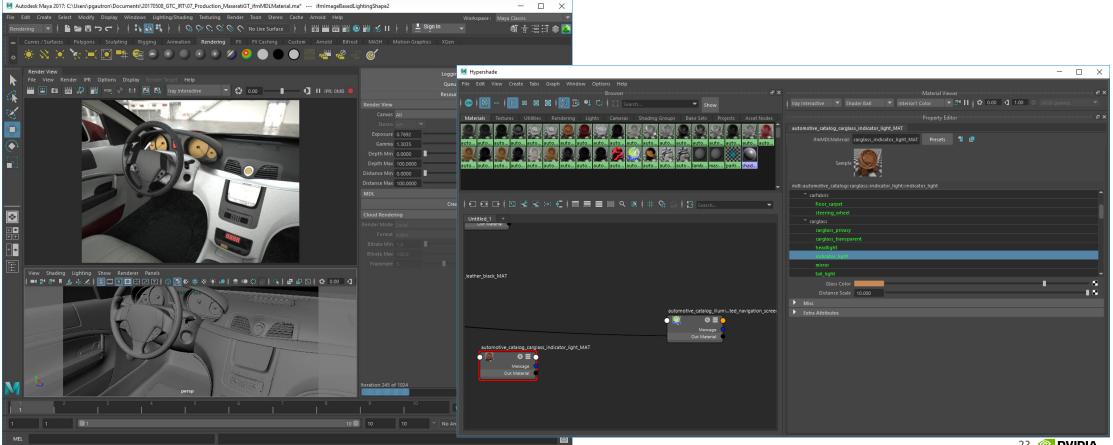


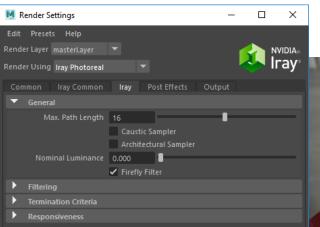
http://mdlhandbook.com

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

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#### IRAY FOR MAYA MDL in Hypershade





#### **Render Settings**

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## **IRAY INTERACTIVE**

#### Flexible Rendering



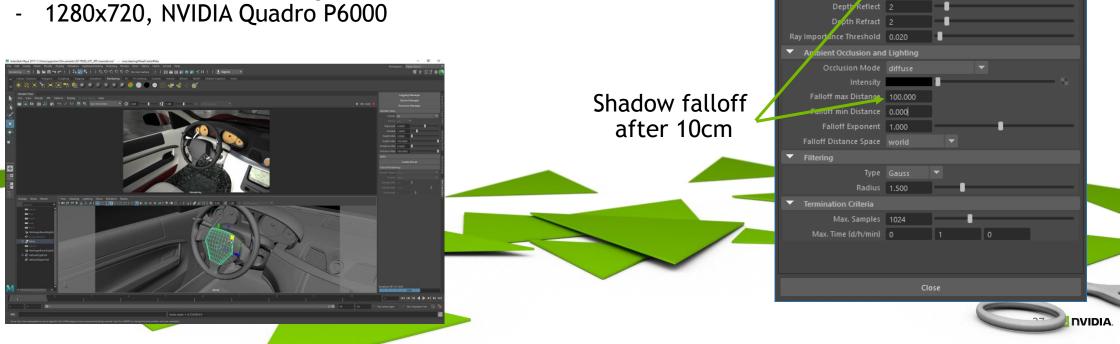
#### **MODELING/REVIEW** M Render Settings X Render Layer masterLayer **NVIDIA** - 0 × Matodesk Maya 2017: C:\Users\pgautron\Documents\20170508\_GTC\_IRT\maserati.ma\* --- mas:steeringWheelCenterPlate rav File Edit Create Select Modify Display Windows Lighting/Shading Texturing Render Toon Stereo Cache Arnold Help Render Using Iray Interactive Rendering 🔽 🛉 🔚 つ 🗁 🕴 🕂 🔣 🛼 👌 キー 🗣 🖓 🌣 🌾 🌔 🔍 🖉 🏷 🔍 🔗 🔍 No Live Surface 🗼 🕇 👹 🚟 🚟 🚳 🚟 🚿 日 👌 🗍 🕹 Sign In 🚽 新卡运日参区 Common Iray Common Iray Post Effects Output 🔅 💥 🔆 🍾 📜 🌉 🎭 🗛 💿 💿 💿 🖉 🧶 🔵 🔵 🔵 é Indirect Light Mode off 🔛 🖾 🏭 🖓 🚟 Rog 📲 1:1 🖭 🖳 Iray Interactive 🛛 🔻 🛟 0.00 🛛 🕒 📢 1.00 👘 👘 Firefly Filter Shadows Ibl Falloff Gamma 1.0000 Depth 2 Depth Max 100 0000 Depth Reflect 2 Distance Min 0.0000 Distance Max 100.0000 Depth Refract 2 Ray Importance Threshold 0,020 \* H • Occlusion Mode diffuse View Shading Lighting Show Renderer Panels ↓ |=< 2<sup>4</sup> <sup>(24</sup> <sup>(34</sup> <sup>(34</sup> <sup>(34</sup>)), <sup>(34)</sup> <sup>(3</sup> Falloff max Distance 100.000 -Falloff min Distance 0.000 -Falloff Exponent 1.000 Falloff Distance Space world list ifmlmageBa 🖌 🛃 Table Type Gauss 🖽 🕥 defaultLightSet a defaultObjectSet Radius 1.500 Max. Samples 1024 Max. Time (d/h/min) 0 144 14 14 4 🕨 🖬 🖬 10 10 Undo: move -r -6.735709 0 0

**DVIDIA** 

#### **MODELING/REVIEW**

Key Features:

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



No indirect lighting

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NVIDIA

M Render Settings

Edit Presets Help Render Layer masterLayer

Render Using Iray Interactive

Common Iray Common Iray

Indirect Light Mode off

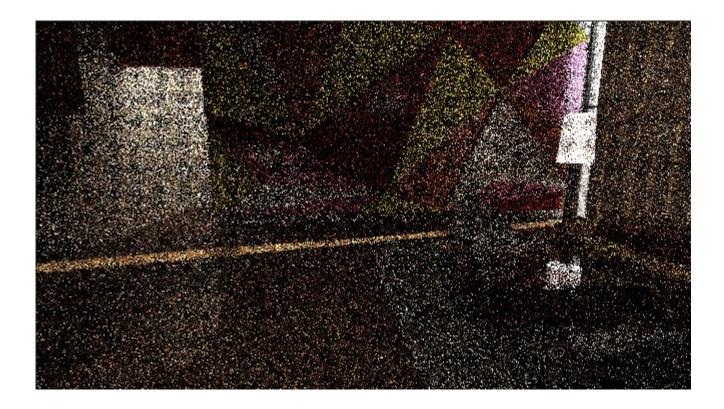
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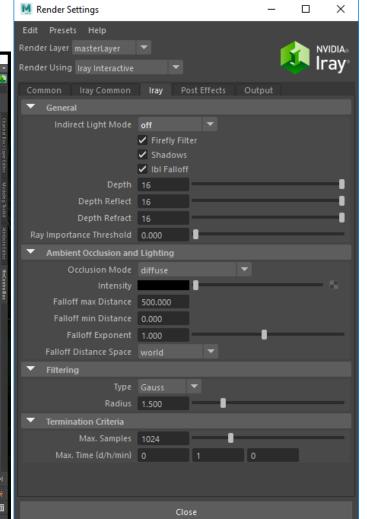
## INTERIOR LAYOUT

#### Interacting with Photorealistic Path Tracing



#### **INTERIOR LAYOUT**

			Render Layer masterLayer
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Move Tool: Use manipulator to move object(s), Ctrl+MMB+drag to move components along normals. Use D or INSERT to change the pilot position and axis orient	nation.		

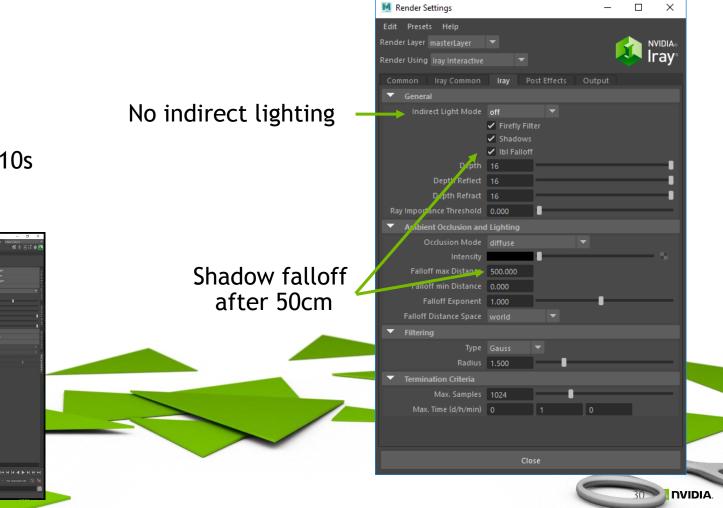


### **INTERIOR LAYOUT**

Key Features:

Palyana Sculpting Rugging Animation Rendering PX Pricedu

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



#### LIGHTING DESIGN

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M Render Settings \_  $\times$ NVIDIA: X.

## LIGHTING DESIGN

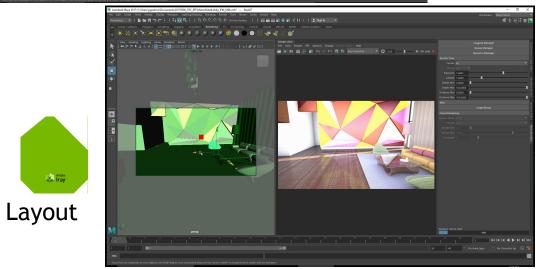
Edit Presets Help Render Layer masterLayer NVIDIA Irav Render Using Iray Interactive Iray Output Key Features: Full indirect lighting Indirect Light Mode fine scale Firefly Filte Dynamic scene updates @4.5fps Shadows Physically plausible solution, converged in ~4min Ibl Falloff Depth 16 1280x720, NVIDIA Quadro P6000 Depth Reflect 16 Depth Refract 16 Ray Importance Threshold 0,000 Occlusion Mode diffuse Other approximations Palyaaro Soufating Rogang Animation Rendering IX PrCod Falloff max Distance 500,000 ignored Falloff min Distance 0.000 Falloff Exponent 1.000 Falloff Distance Space world Type Gauss Radius 1.500 Max. Samples 1024 Max. Time (d/h/min) 0 **DVIDIA** 

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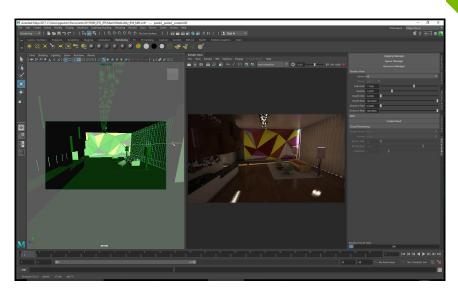
M Render Settings



# 



#### Interactive



Lighting

Iray

33 📀 nvidia.

#### **IRAY FOR RHINO**

#### The Video for Pascal Pickup truck.3dm (769 MB) - Rhinoceros WIP - [Perspective] File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Panels Help

#### Standard | CPlanes / Set View / Display / Select / Viewport Layout / Visibility / Transform / Curve Tools / Surface Tools / Solid Tools / Mesh Tools / Render Tools / Drafting

#### 

Select objects. Press Enter when done: 14 surfaces, 1098 polysurfaces added to selection.

Irt Draft



#### **Irt Production**



## INTERIOR LAYOUT WITH HOMEBYME

Web Interface

C DEMO ① ⇔ Ground floor ∨		
	<page-header><page-header><image/><image/></page-header></page-header>	
	+ ADD A PRODUCT	+ - 2D 3D 98

**NVIDIA** 

#### **INTERIOR LAYOUT WITH HOMEBYME**

~5mins 4xGrid K520



#### **INTERIOR LAYOUT WITH HOMEBYME**

~5mins 4xGrid K520

-] Homebyme

**NVIDIA** 

-0

#### **INTERIOR LAYOUT WITH HOMEBYME**

Iray Interactive

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**NVIDIA** 

~5mins

4xGrid K520

#### **INTERIOR LAYOUT WITH HOMEBYME**

~5mins 4xGrid K520





#### 360/VR RENDERING Iray Interactive

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Resolution: 2 x 4096x2048

~50min

4xGrid K520

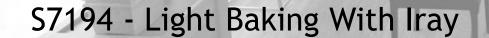




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**NVIDIA** 

#### **FUTURE WORK: LIGHT BAKING**



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

#### CYMAX SERTA TRINIDAD DELUXE SOFA IN CHOCOLATE FABRIC COME TO THE HOMEBYME TALK

(i) INFO

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VISIT STORE

X

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

cymax

DEMO ()

[6]

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FF.

😔 Ground floor 🗸

360

6

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#### Fast, Easy, Fun



**Medium Quality** 

Configuration 1 🔹 🖉 🖑 🏹 🏚 💟 🛞 \*

Resolution: 1280x720

Polygon Count: 10425573 Focal Length: 48.19(mm)





Fast - GPUOnly

Models

Appearances Renes

TO Cameras

Model courtesy of PGO Automobiles

Passes: 1 Passes per second: 0.00

High Quality

🖈 🖻 + Configuration 1 🔹 🖋 🚱 🖆 🏹 📩 🔛 🛞





Resolution: 1280x720 Polygon Count: 10560981

Focal Length: 48 19(mm)

Fast - GPUOnly

 Model
 Appearance
 Constrained
 Constrained
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 Appearances
 Image: Secret
 Image: Constrained
 Image: Constraine

## Andel credit: Kieron Dunk on TurboSquid Model d

Model courtesy of PGO Automobiles

Passes: 79 Rendering Paused



2000

#### Iray Photoreal





Model courtesy of PGO Automobiles





Fast Medium Quality Solid WORKS / Visualize Model credit: Kieron Dunk on TurboSquid Model courtesy of PGO Automobiles

Fast High Quality

1000

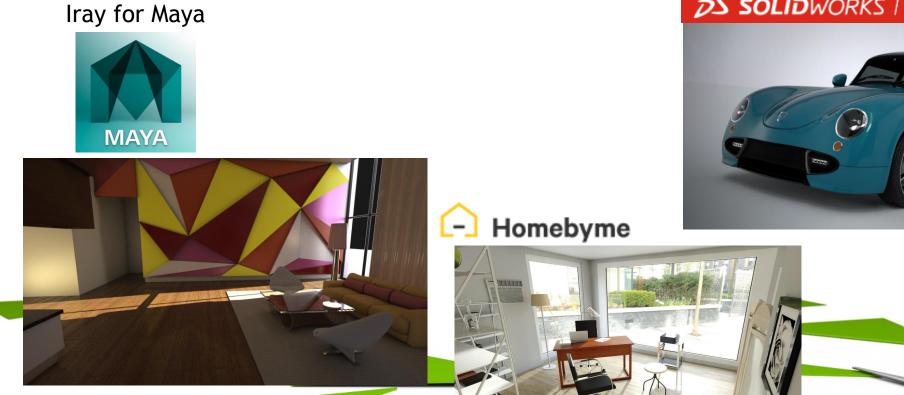








#### **IRAY INTERACTIVE**



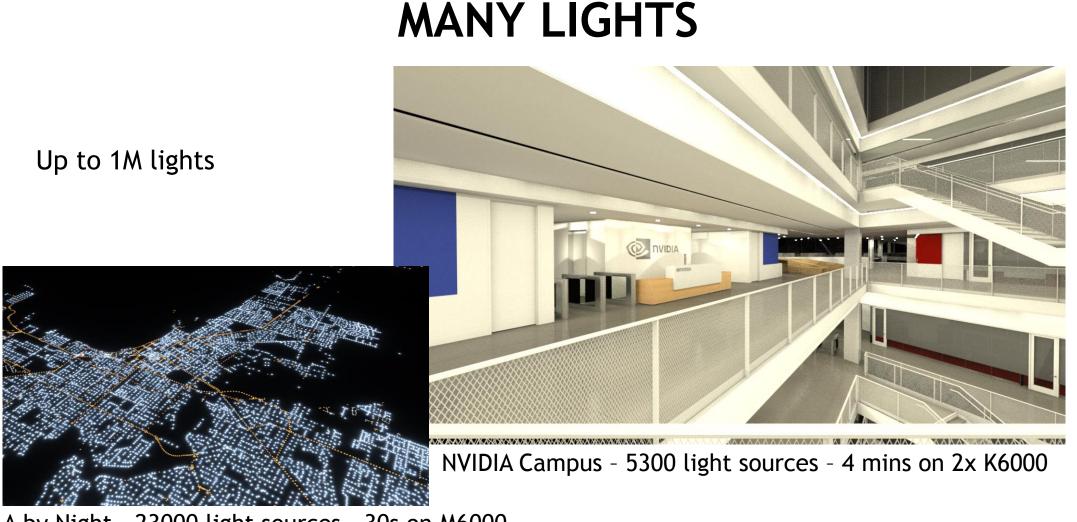
Solidworks | Visualize



**NVIDIA** 

#### WHAT'S COMING?



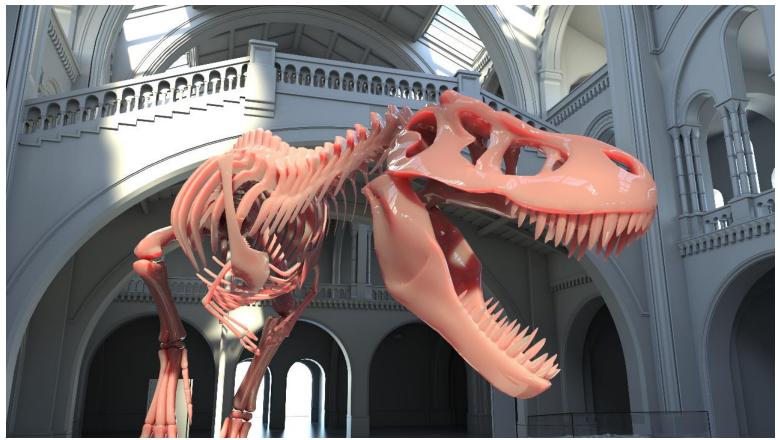


LA by Night - 23000 light sources - 30s on M6000

Coming in Iray for Maya 2017 51 SI NIDIA.

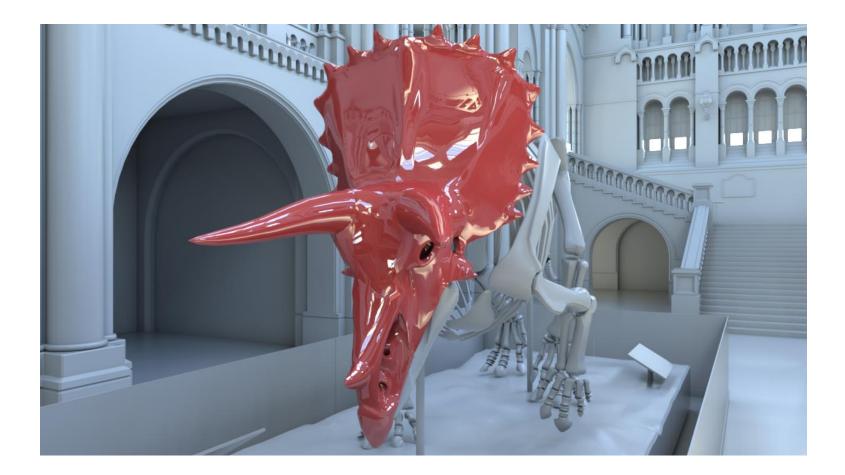
#### SUBSURFACE SCATTERING

Fast SSS Approximation



#### Coming in Iray for Maya 2017 52 SINUDIA.

#### **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



Time

batch



55 📀 nvidia

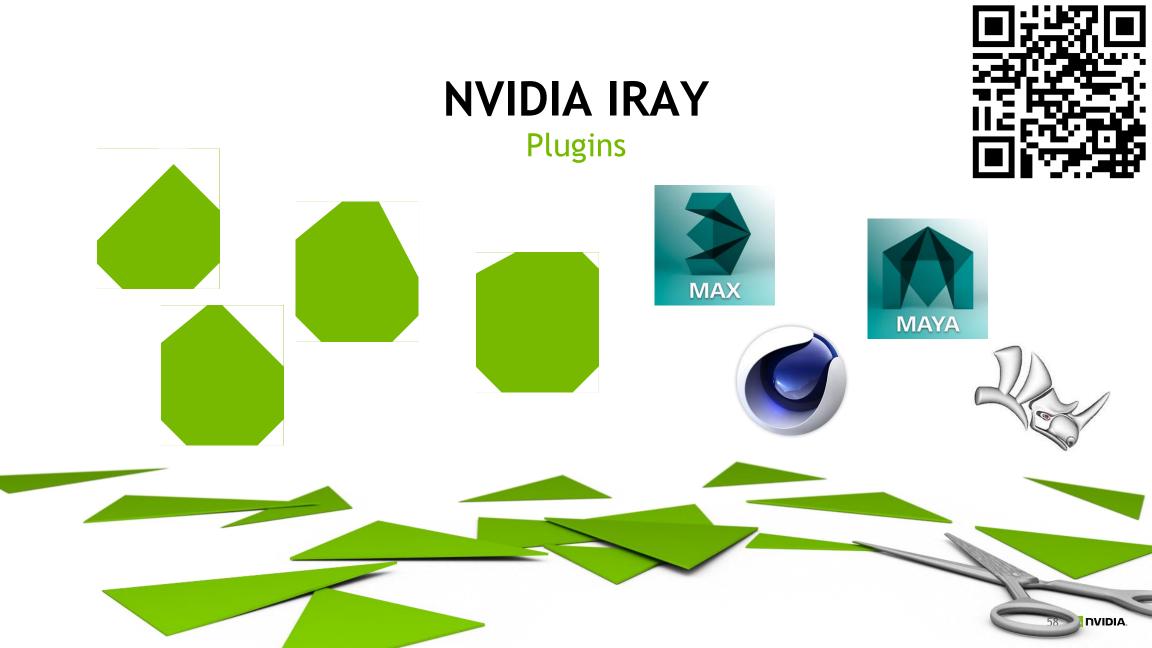
## **IRAY INTERACTIVE**

#### Locally









# **IRAY INTERACTIVE** Integrations **L-** Homebyme mycs<sup>∂</sup> **35 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 samp irt fast convergence start matte shadow affects alpha remap uv to dome in aux canvas ray firefly filter iray nominal luminance irt refract backplate rt refract backplate blen glossy ground r ronment resolution iray irt environment max matte visible in aux canv

NIDIA 🚺

### PHOTOREAL OR INTERACTIVE?



Photoreal



Interactive





### **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

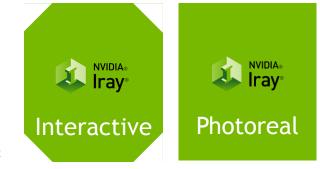
S7440 - Create high-quality materials from scans with MDL and Substance – Tuesday 4:00-4:50PM – 230C P. Maheut, J. Derel - Allegorithmic

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

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