

# SIGGRAPH 2011

Advanced Production  
Techniques with  
mental ray and iray

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NVIDIA ARC, Training & Special Projects



Look development: using iray in

- Design
- Entertainment

Motion blur / Depth of field for shiny stuff

Approximation to brute force rendering

Variation across large numbers of objects

Technology Demo: AO pass with GPU

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# Look development using iray in Design



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# Look development using iray in Entertainment









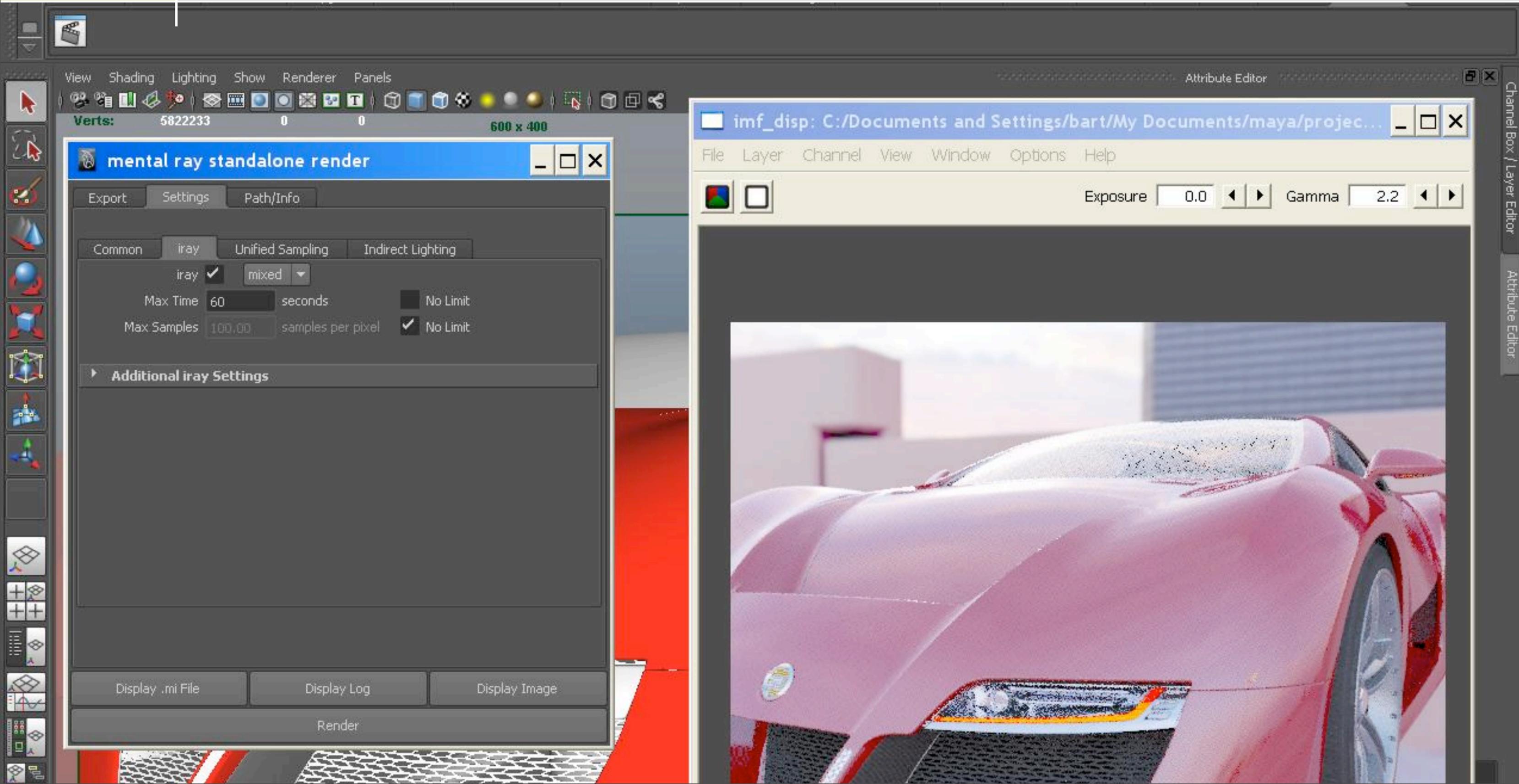
## mental ray 3.9 standalone using iray

Use Python script available on forum for UI from Maya

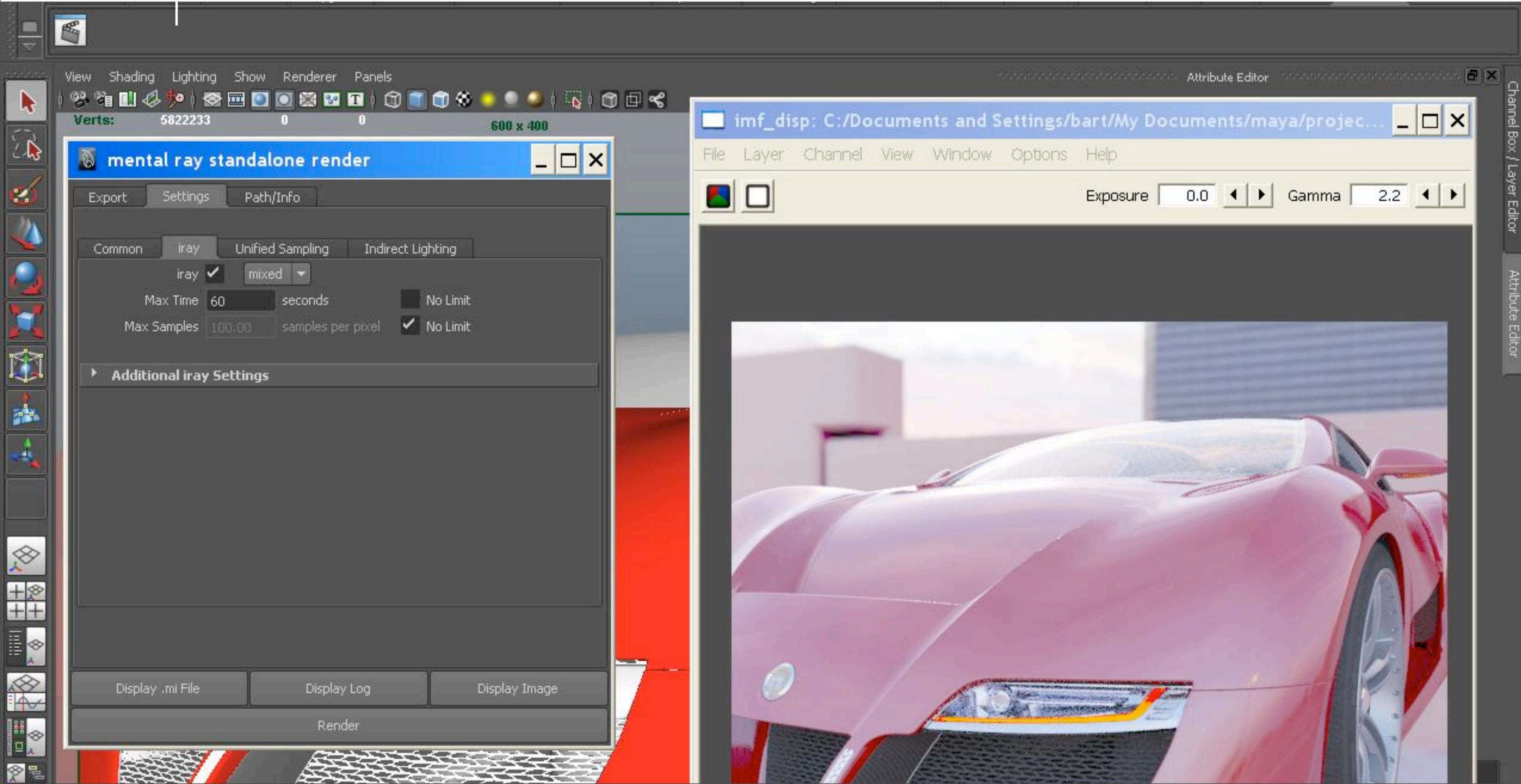
Translates scene to mi file and renders with standalone using iray

- iray settings
- manage render iterations

# Look development using iray in Entertainment



# Look development using iray in Entertainment



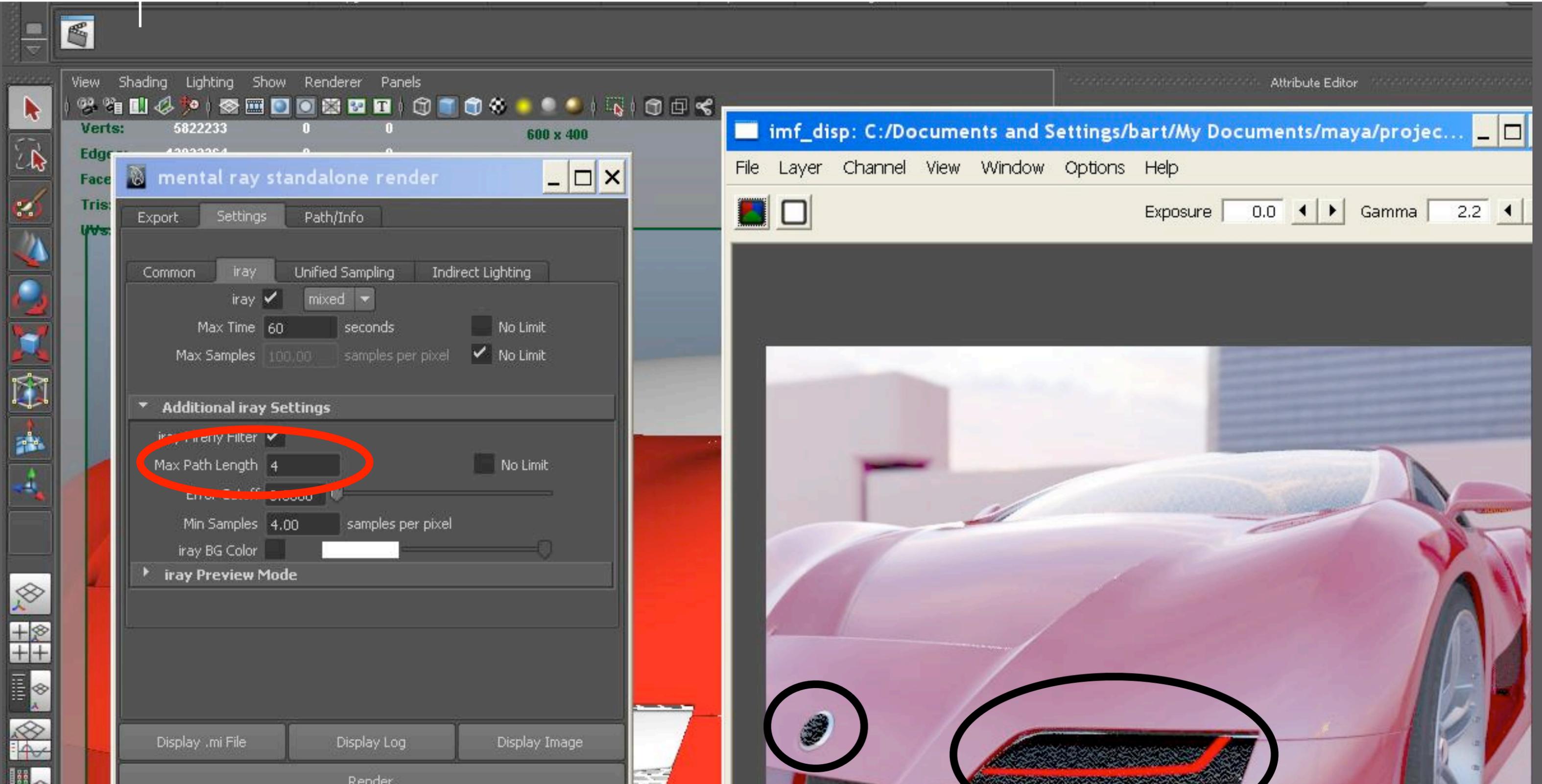
## mental ray 3.9 standalone using iray

Render single frame for look reference

Choose approximating techniques required based on reference, eg

- Trace Depth settings
- Indirect technique, GI/FG/IP/Caustics

# Look development using iray in Entertainment



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# Motion blur / Depth of field for shiny stuff

## Typical Issues

Rasterizer not giving correct results for highly reflective and refractive surfaces

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Rasterizer not giving correct results for highly reflective and refractive surfaces

Tune sampling for static scene, which gets approved, ...

then turning on motion blur increases render time significantly

## mental ray 3.9 feature

Simplified sampling control with

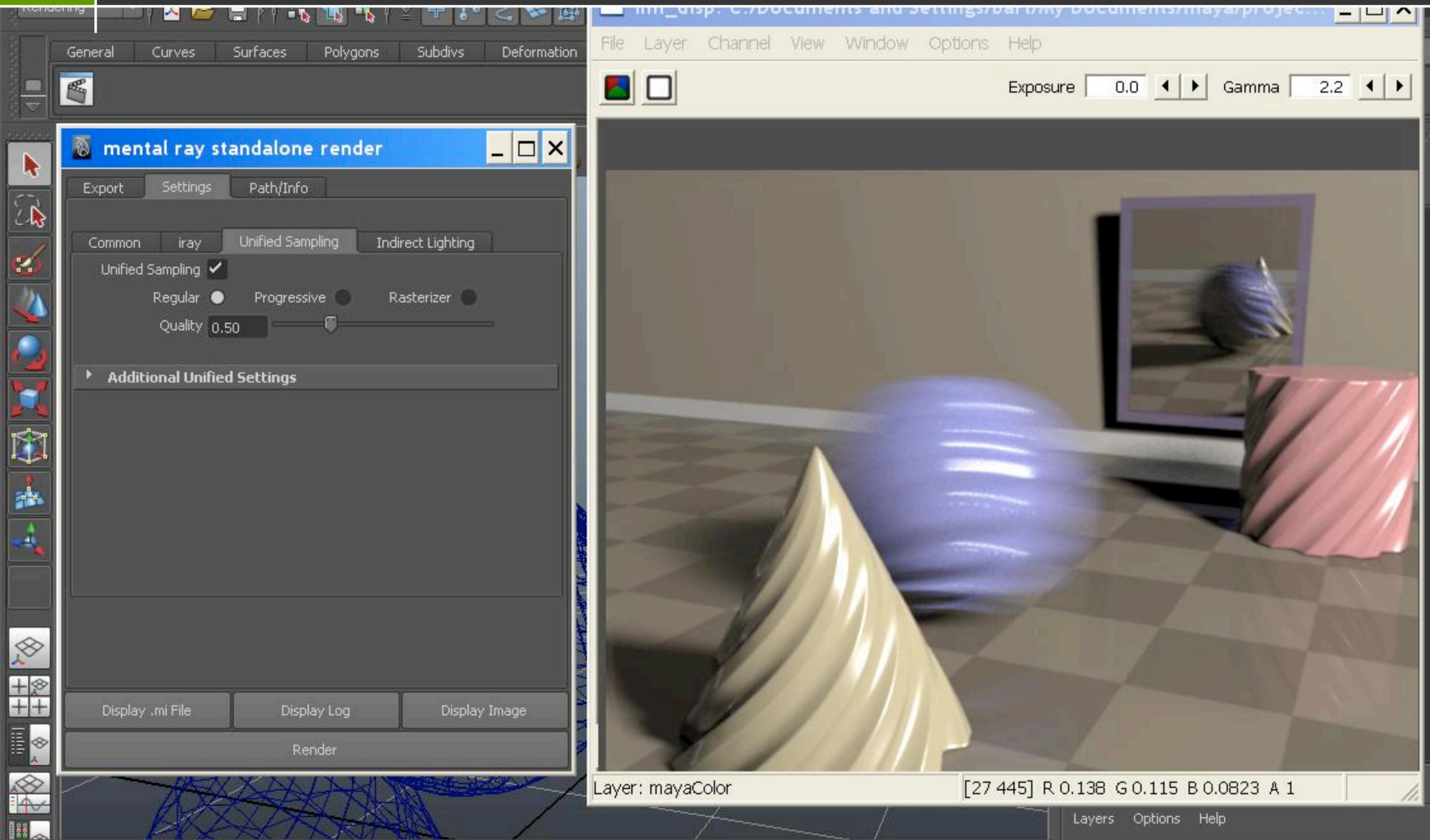
**unified sampling**

One major sampling control with

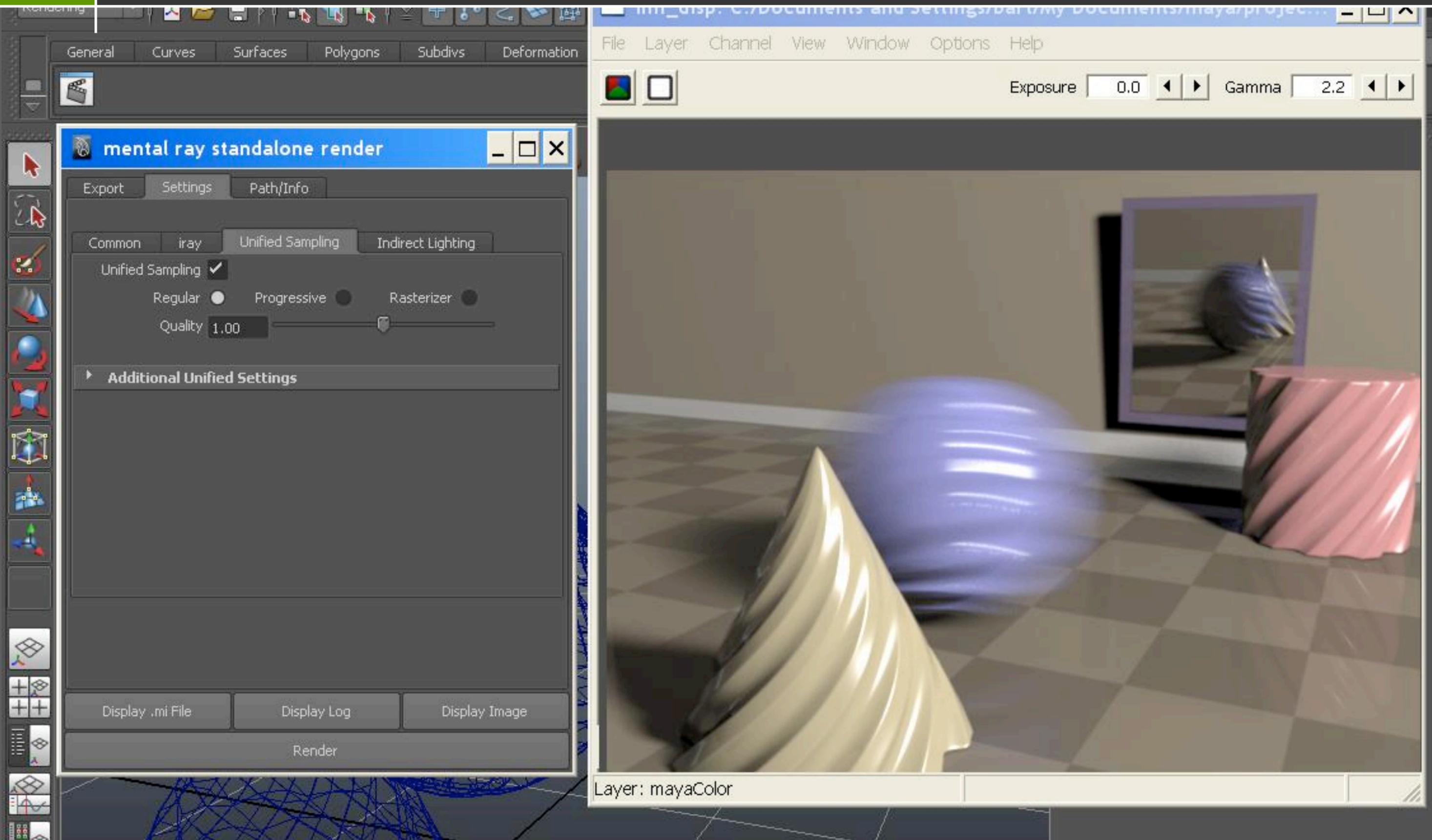
**samples quality**

... sampling in both space and time

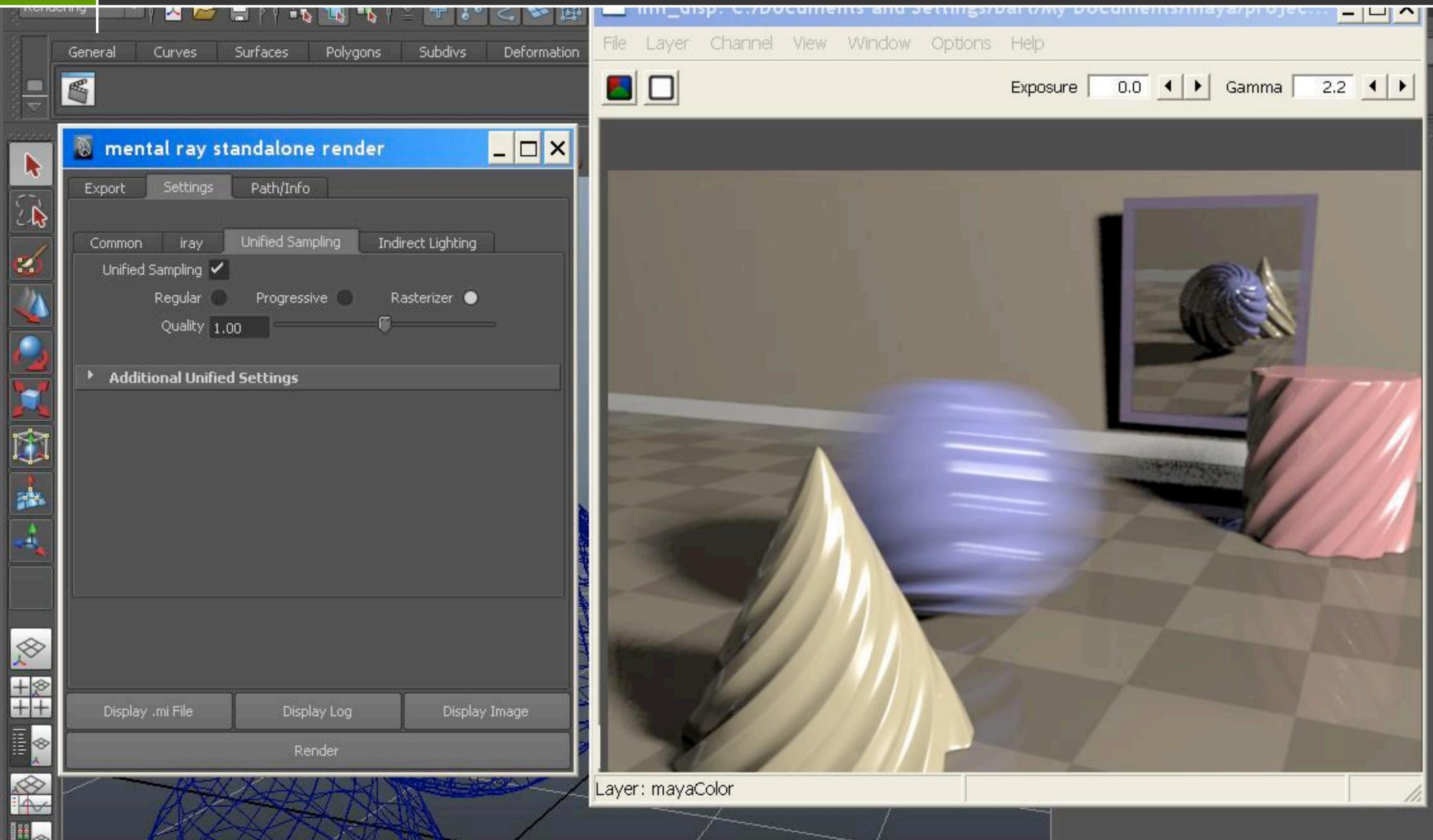
# Look development using iray in Entertainment



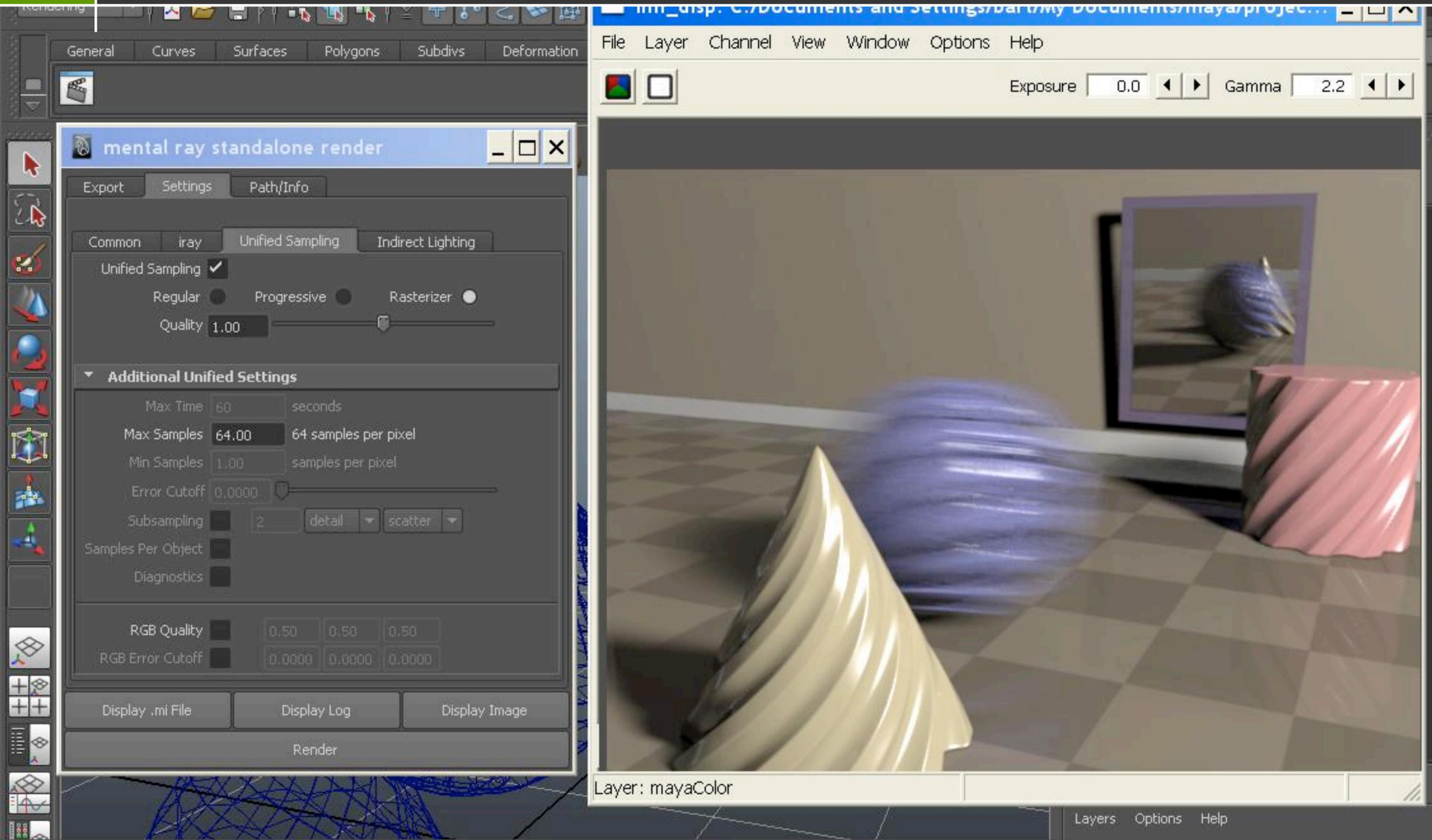
# Look development using iray in Entertainment



# Look development using iray in Entertainment



# Look development using iray in Entertainment



## mental ray 3.9 feature

Improved raytraced motion blur

**bsp2 speed improvements**

Rotating reflections preserved

**accurate normal handling in motion**

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# Approximation to brute force rendering

## Typical Issues

Pipeline needs complete redesign for single, constrained render engine

Inflexible shader and pass options limit look control and approval process

## mental ray 3.9 feature

Path tracing approach sharing iray tech  
**unified sampling**

Flexible shader choices allow trade-offs  
**traditional or BSDF**

Multi-pass supported traditionally, flexibly

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## Typical Issues

Too many materials required for simple variation, potentially using thousands of shader networks

Fixed naming or types of attributes limit attribute and therefore material flexibility

# Variation across large numbers of objects



The image displays the Blender 2.79 software interface. The central 3D viewport shows a vast field of yellow tulips with green stems and leaves, rendered in a realistic style. A single tulip in the center is highlighted with a green wireframe and a selection box. The top of the interface features a menu bar with options like View, Shading, Lighting, Show, Renderer, and Panels. Below the menu bar is a toolbar with various icons for navigation and editing. On the left side, there is a vertical toolbar with icons for different tools. The right side of the interface is occupied by the Attribute Editor, which is currently showing the properties for a material named 'mia\_material\_x1'. The Attribute Editor has tabs for 'List', 'Selected', 'Focus', 'Attributes', 'Show', and 'Help'. The 'Selected' tab is active, showing the material's name and a 'Sample' button with a green circle. Below this, there are several sections of properties: 'Diffuse' with Color (green), Weight (1.000), and Roughness (0.300); 'Reflection' with Color (white), Reflectivity (0.000), Glossiness (1.000), and Glossy Samples (8); 'Advanced Reflection' with 'Highlights Only' and 'Metal Material' checkboxes; and 'Refraction' with Index of Refraction (1.400). At the bottom of the Attribute Editor, there is a 'Notes' section with the text 'mia\_material\_x1'.

Property	Value
Verts	152800
Edges	223420
Faces	82177
Tris	164354
Vis	157936

Attribute Editor

List Selected Focus Attributes Show Help

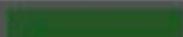
polySurface203 polySurfaceShape203 mia\_material\_x1

mia\_material\_x1: mia\_material\_x1

Sample 

Multiple Outputs

**Diffuse**

Color 

Weight 1.000

Roughness 0.300

**Reflection**

Color 

Reflectivity 0.000

Glossiness 1.000

Glossy Samples 8

Highlights Only

Metal Material

**Advanced Reflection**

**Refraction**

Index of Refraction 1.400

Notes: mia\_material\_x1

## mental ray 3.9 feature

Access attributes in user data attached to any scene element with

### user data shaders

Use existing shader knowledge by adding component shader to any input

Script publicly available to ease use

# Variation across large numbers of objects



The image displays the Blender 2.79 interface. The main 3D viewport shows a field of yellow tulips. A 'userdata' dialog box is open in the center, with the following settings:

- Name: tulip\_diffuse
- Type: color
- Apply to Material: diffuse color
- Value: Red
- Default: White
- Variance: Black

At the top left, a statistics panel shows the following data:

Verts:	152800	34867	0
Edges:	223420	50982	0
Faces:	82177	18752	0
Tris:	164354	37504	0

The right side of the interface shows the 'Attribute Editor' for the selected material, 'mia\_material\_x1'. The 'Diffuse' section is expanded, showing the following settings:

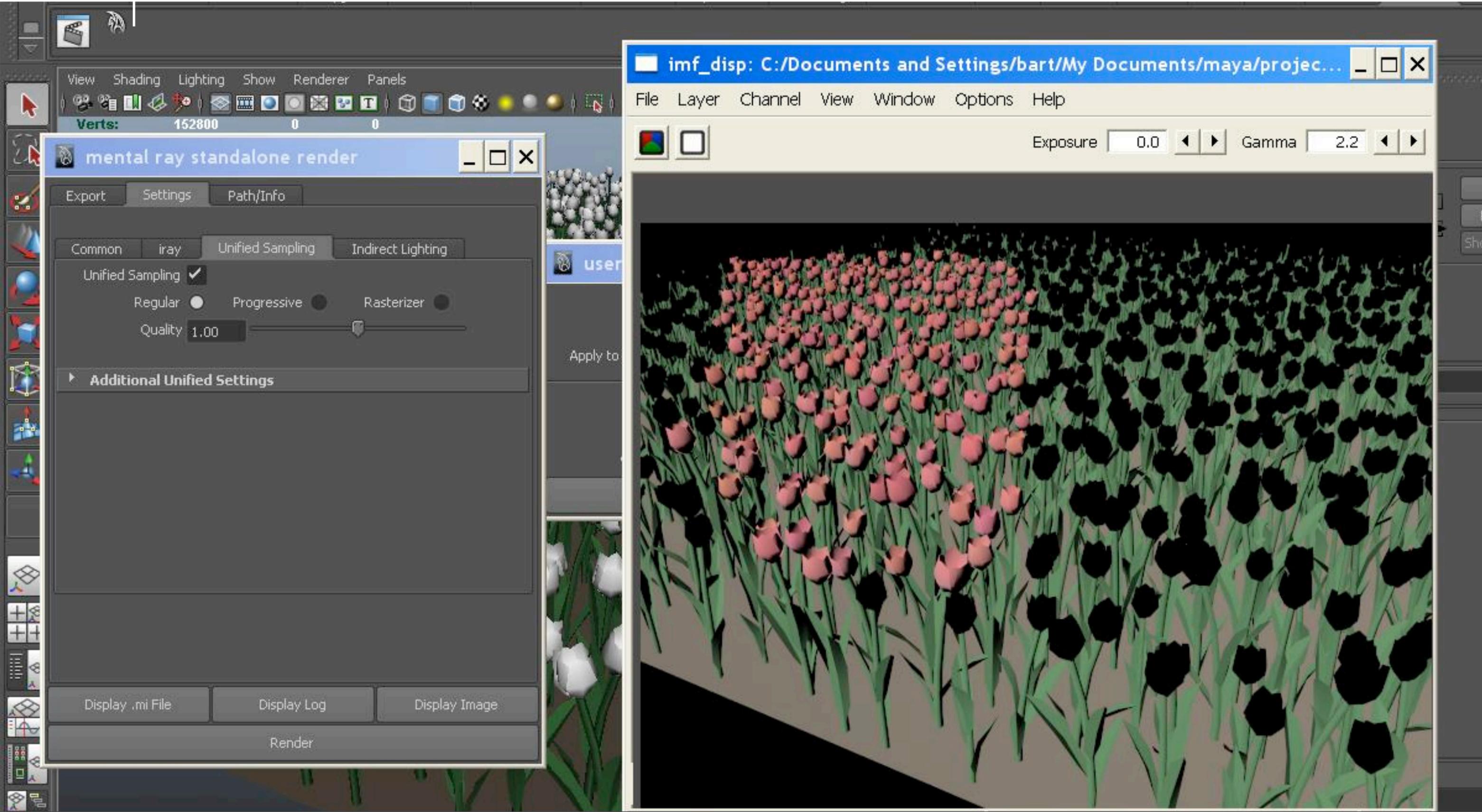
- Color: Green
- Weight: 1.000
- Roughness: 0.300

The 'Reflection' section is also expanded, showing:

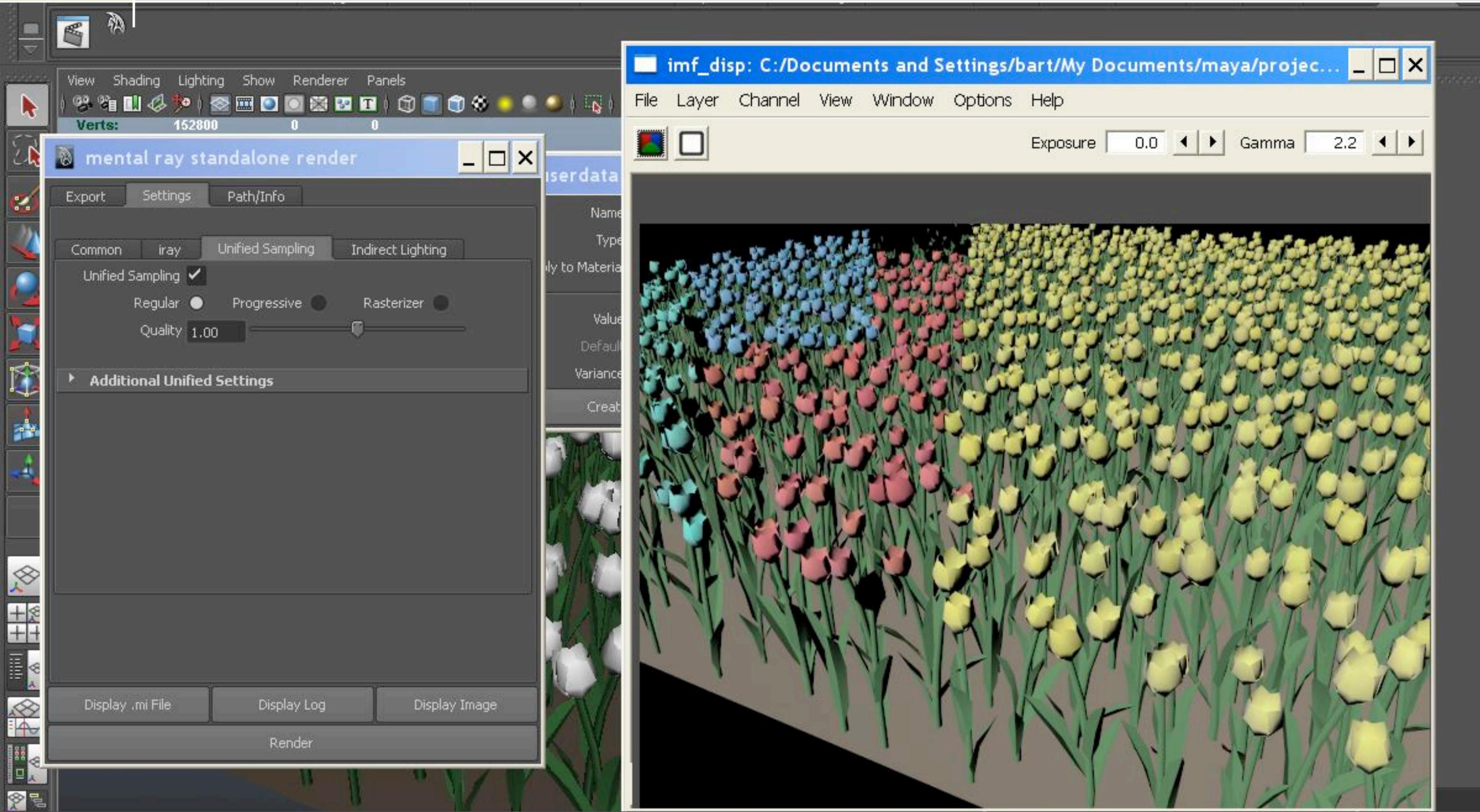
- Color: White
- Reflectivity: 0.000
- Glossiness: 1.000
- Glossy Samples: 8
- Highlights Only:
- Metal Material:

The 'Advanced Reflection' and 'Refraction' sections are partially visible. The 'Index of Refraction' is set to 1.400.

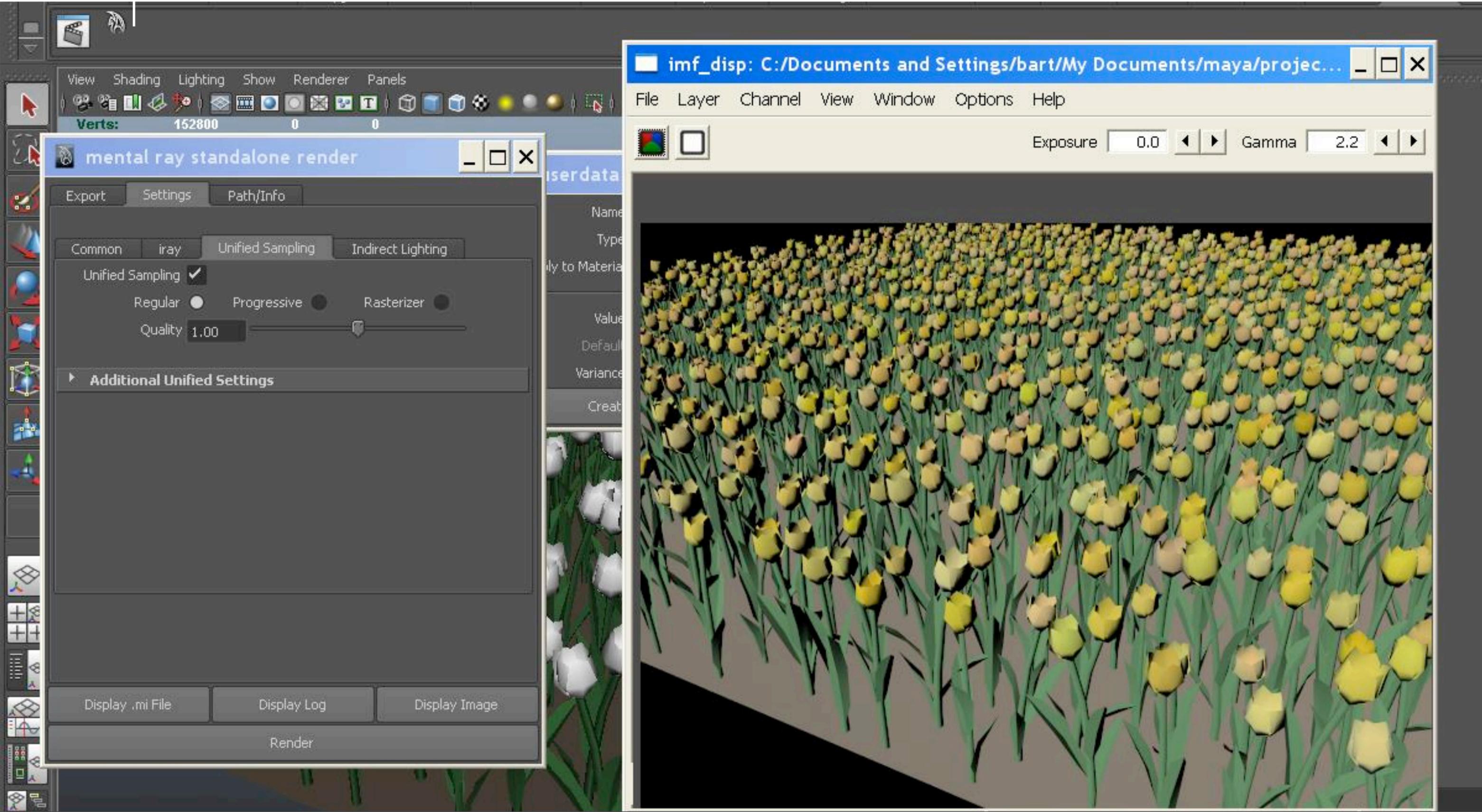
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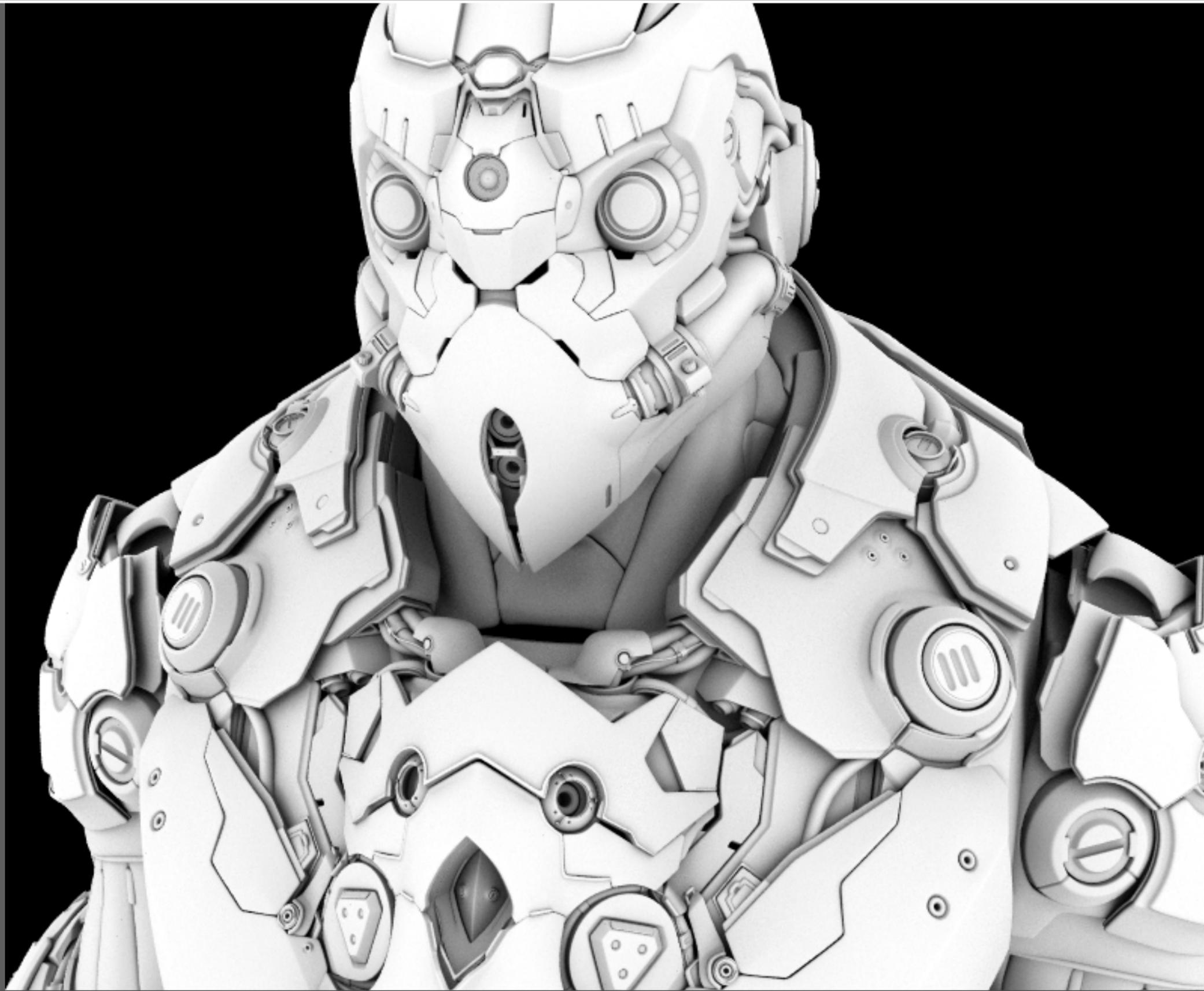
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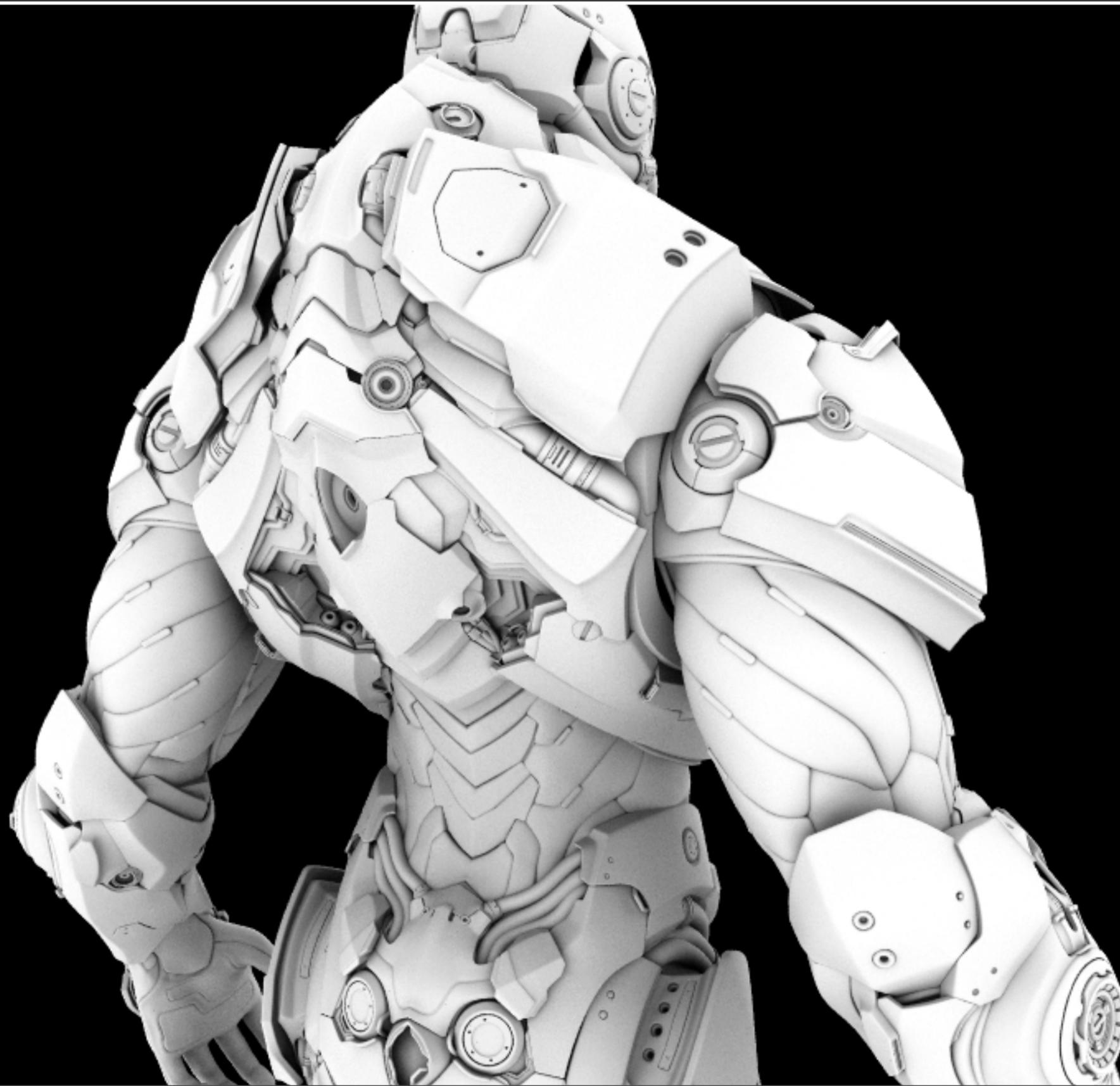
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**Tech Demo: AO pass with GPU**

**Technology Demonstration:  
Ambient Occlusion pass  
with the GPU**





# Thanks!

Special thanks to:  
mental ray team  
iray team