GPU TECHNOLOGY CONFERENCE

May 8-11, 2017 | Silicon Valley

S7185

LEVERAGING NVRTC FOR BUILDING OPTIX SHADERS FROM MDL MATERIALS

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Andreas Mank, ESI Group

2017-05-08

PRESENTED BY NVIDIA

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VISUALIZE REAL-WORLD LIGHTS AND MATERIALS

AGENDA

Introduction

Evolution of the Renderer Architecture

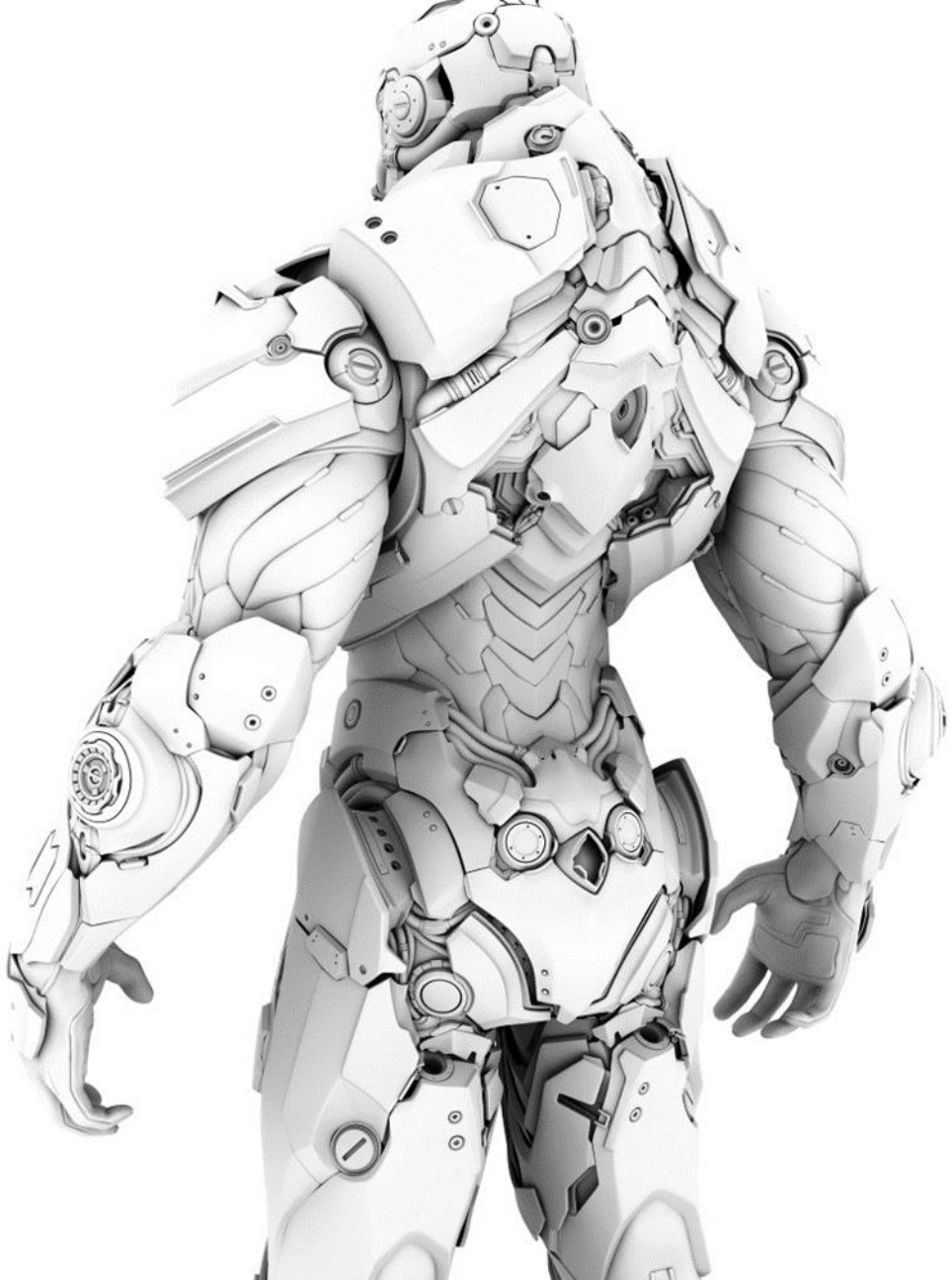
Introduction to NVRTC

Shader Generation from MDL Materials

Integration into ESI IC.IDO

Live Demonstration

INTRODUCTION



MOTIVATION

Scene exchange among applications often loses material information

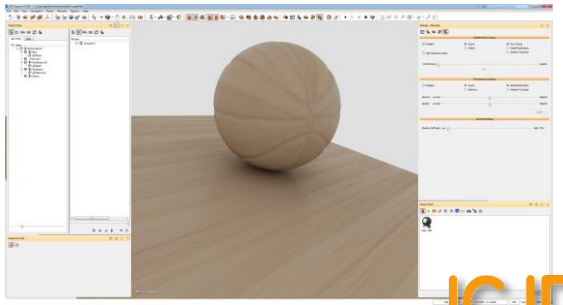
Use the NVIDIA Material Definition Language (MDL) to exchange materials

Take advantage of existing MDL material libraries

Create new MDL materials with available third-party tools

Renderer goal:
Handle MDL materials at runtime on end-user target system

SUBSTANCE DESIGNER



MDL

NVIDIA Material Definition Language

A domain-specific language for abstract declarative material description

Independent of a specific rendering system

Procedural programming language to customize texture image lookups or procedural textures

MDL Handbook and Specifications:
http://www.mdlhandbook.com

More Information:
https://developer.nvidia.com/designworks

OPTIX

NVIDIA GPU Ray Casting API

High-level GPU accelerated ray-casting API

C-API to setup scene and data

Multiple program domains and per ray payload under developer‘s control

Flexible single ray programming model

Supports multi-GPU and progressive rendering on remote NVIDIA VCA cluster

Develop "to the algorithm"

volume scattering and dispersion

hair intersection and shading

EVOLUTION OF THE RENDERER ARCHITECTURE

RENDERER IMPLEMENTATION

Goal: Handle MDL Materials at Runtime

Represent complex layered material hierarchies as CUDA C++ code

- Templated classes for layered material construction from "fixed-function" building blocks (BSDFs, EDFs, VDFs, Layers, Mixers, Modifiers, Conditionals)

Connect user defined parameter calculations with building blocks

- Derive from generated "getter" classes which fill building block input parameters.
  All functions inlined into material hierarchy traverser function.

Generate high-level CUDA C++ code

- Easy prototyping and debugging before writing the code generator.
  Benefit from all optimizations inside the CUDA compiler.

ray_gen
- lens shader
- integrator
- output

pinhole
thin_lens
fisheye
sphere

closest_hit
- material traverser
- eval EDF
- sample BSDF
- direct lighting?
- sample light
- eval BSDF

edf
edf_diffuse
edf_spot
edf_measured

bsdf
backscattering
diffuse_reflection
diffuse_transmission
glossy
measured
specular
beckmann_smith
beckmann_vcavities
ggx_smith
ggx_vcavities
ward_geisler_moroder

miss_null
miss_constant
miss_env

light_constant
light_env
light_mesh

bounding_box
intersection

any_hit
- material traverser
- cutout opacity?

* rectangles are fixed-function code
* round rectangles are bindless callable programs

INTRODUCTION TO NVRTC

NVRTC vs. NVCC

CUDA Compilation

NVRTC standalone library

- Translates CUDA C++ source to PTX device code
- End-users do not need a full development environment (e.g. MSVS)
- Three times faster compile times compared to NVCC

NVCC CUDA Compiler

- Supports host and device code
- Works in combination with a host compiler of a full development environment

NVRTC

Advantages of Runtime Compilation

- OptiX shaders can be compiled on-demand
  - Applications do not have to provide a large number of individual shaders upfront
  - Materials can be created and changed at runtime
- Specialized shaders improve performance
  - No large „uber-shaders“ necessary
  - Shader code can be kept compact

NVRTC API

CUDA C++ Runtime Compilation to PTX

```
nvrtcProgram prog;
nvrtcCreateProgram(&prog, src, NULL, 0, NULL, NULL);

nvrtcCompileProgram(prog, numOptions, options);

nvrtcGetProgramLogSize(prog, &logSize);
if (1 < logSize)
{
  nvrtcGetProgramLog(prog, log);
}

nvrtcGetPTXSize(prog, &ptxSize);
if (1 < ptxSize)
{
  nvrtcGetPTX(prog, ptx);
}

nvrtcDestroyProgram(&prog);
```

Input CUDA C++ code

Compiler options

Potential error log

Output PTX code

NVRTC

Compilation Options

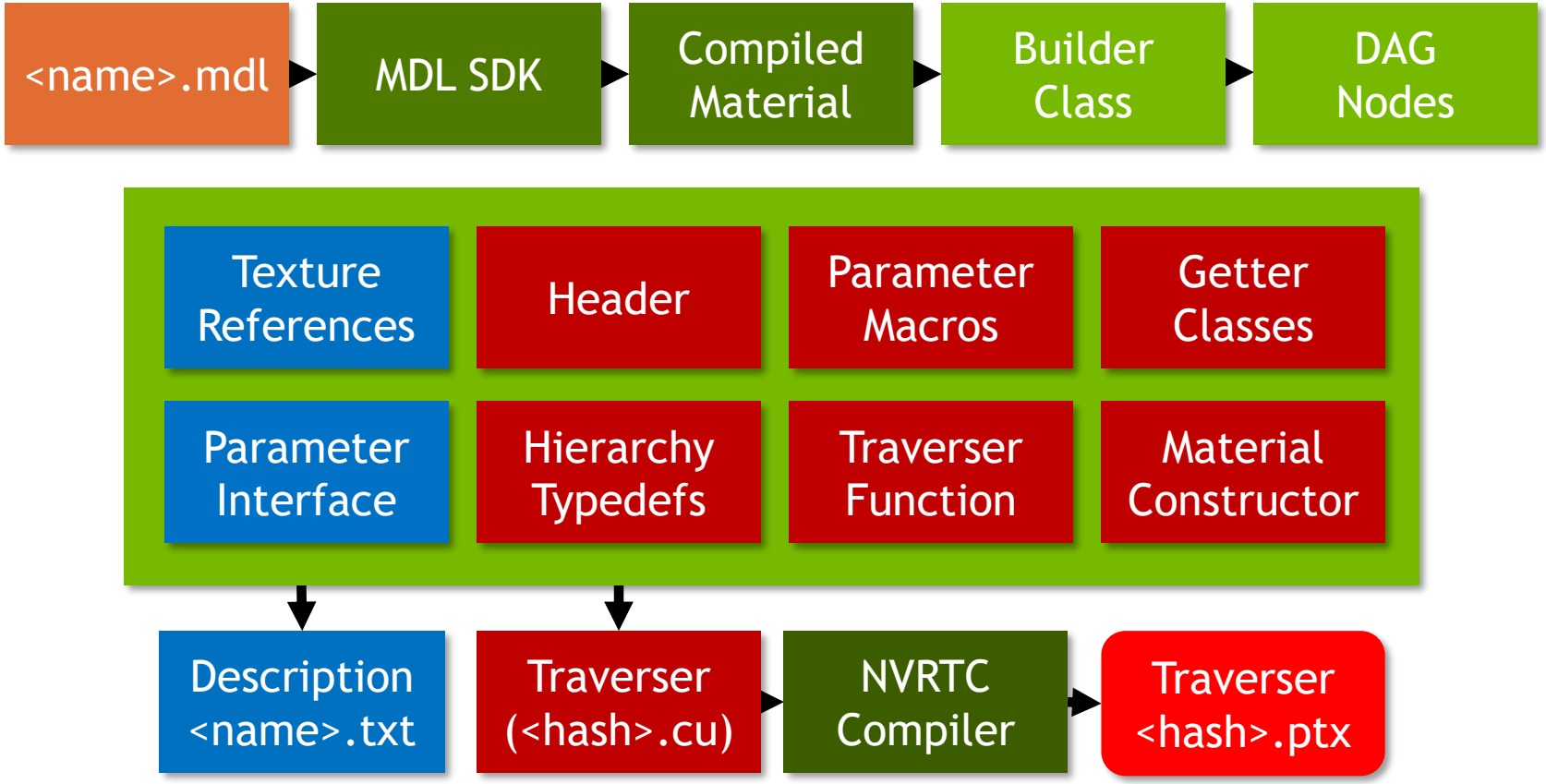
```
const std::string cudaIncludes     = std::string("-I") + m_cudaIncludePath;
const std::string optixIncludes    = std::string("-I") + m_optixIncludePath;
const std::string rendererIncludes = std::string("-I") + m_rendererIncludePath;

const char* options[] =
{
  "--gpu-architecture=compute_30",
  "--use_fast_math",
  "--device-as-default-execution-space",
  "--relocatable-device-code=true",
  "-D__x86_64",
  cudaIncludes.c_str(),
  optixIncludes.c_str(),
  rendererIncludes.c_str()
};
```

SHADER GENERATION FROM MDL MATERIALS

OPTIX SHADER GENERATION

Using the MDL SDK and NVRTC



INTEGRATION INTO ESI IC.IDO

GPU TECHNOLOGY CONFERENCE

“ESI Rendering Innovations with NVIDIA DesignWorks™”

Andreas Mank, Team Leader Visualization, ESI Group
Markus Tavenrath, Senior Developer Technology Engineer, NVIDIA

— Source: GTC 2016, s6306

“MDL Materials to GLSL Shaders – Theory and Practice”

Andreas Süßenbach , Senior Developer Technology Engineer, NVIDIA
Andreas Mank, Team Leader Visualization, ESI Group

— Source: GTC 2016, s6311

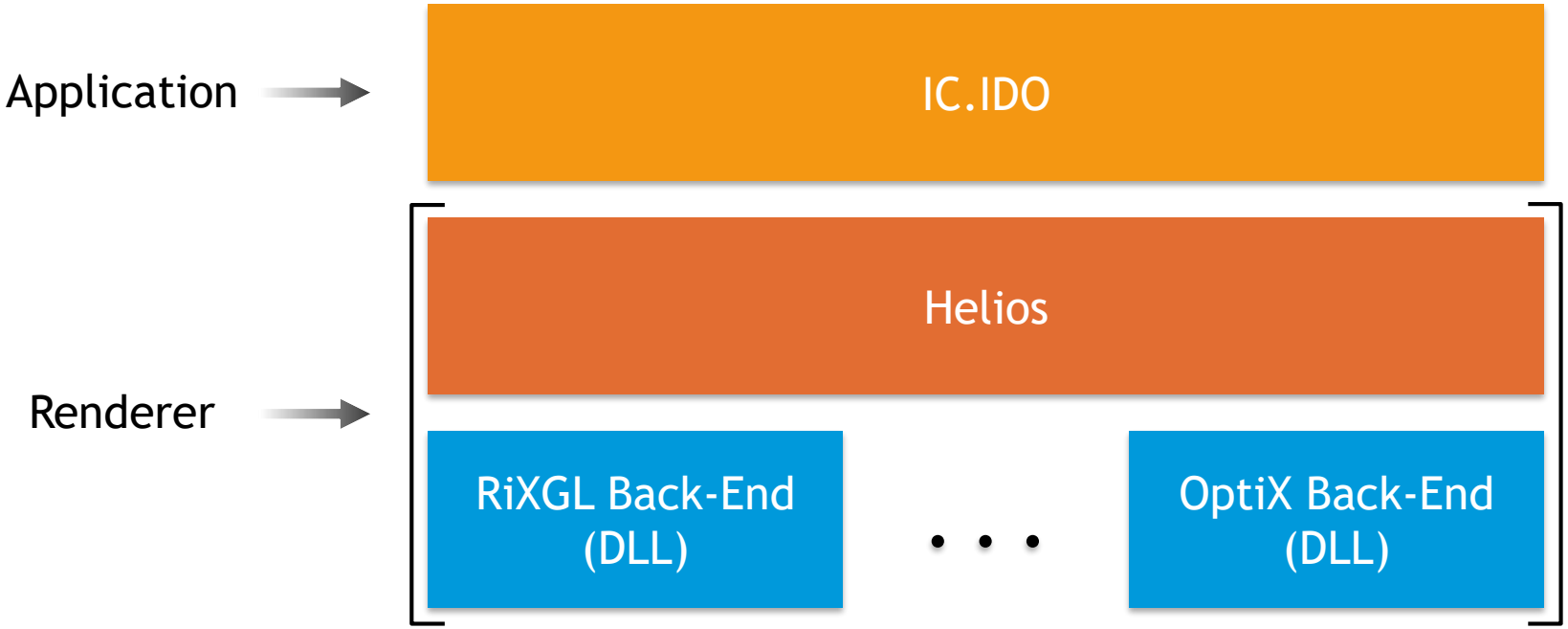
“Implementing MDL Materials with Support for IES Lights and AxF Appearance Representations”

Detlef Roettger, Senior Developer Technology Engineer, NVIDIA
Andreas Dietrich, Senior Software Developer Visualization, ESI Group

— Source: GTCEU 2016, s6135

Helios Rendering Architecture

Overview



Helios Rendering Architecture

Interfaces

Application API

Helios

- Load and unload rendering back-ends (DLLs can be loaded at run-time)
- Switch between back-ends (e.g., ray tracing or rasterization based)
- Render graph control (e.g., hybrid rendering, frame composition)
- Provide original (unoptimized) scene data

Back-end API

Back-End

- Set scene geometry and transformations (flattened two-level scene graph)
- Set rendering parameters (e.g., materials, lights, whitted ray tracing or GI)

Helios OptiX Back-End

Helios

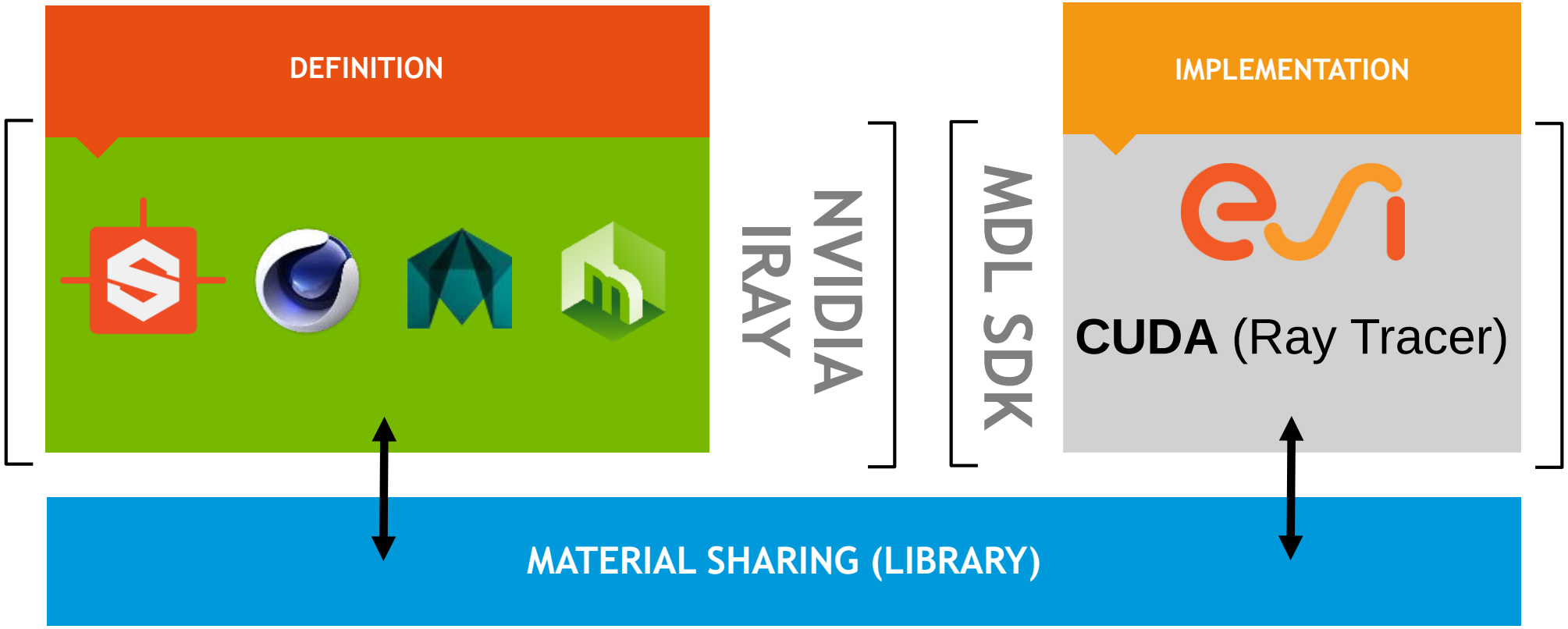
OptiX Back-End

MDL Parser
- Reads MDL files
- Generates material parameter lists

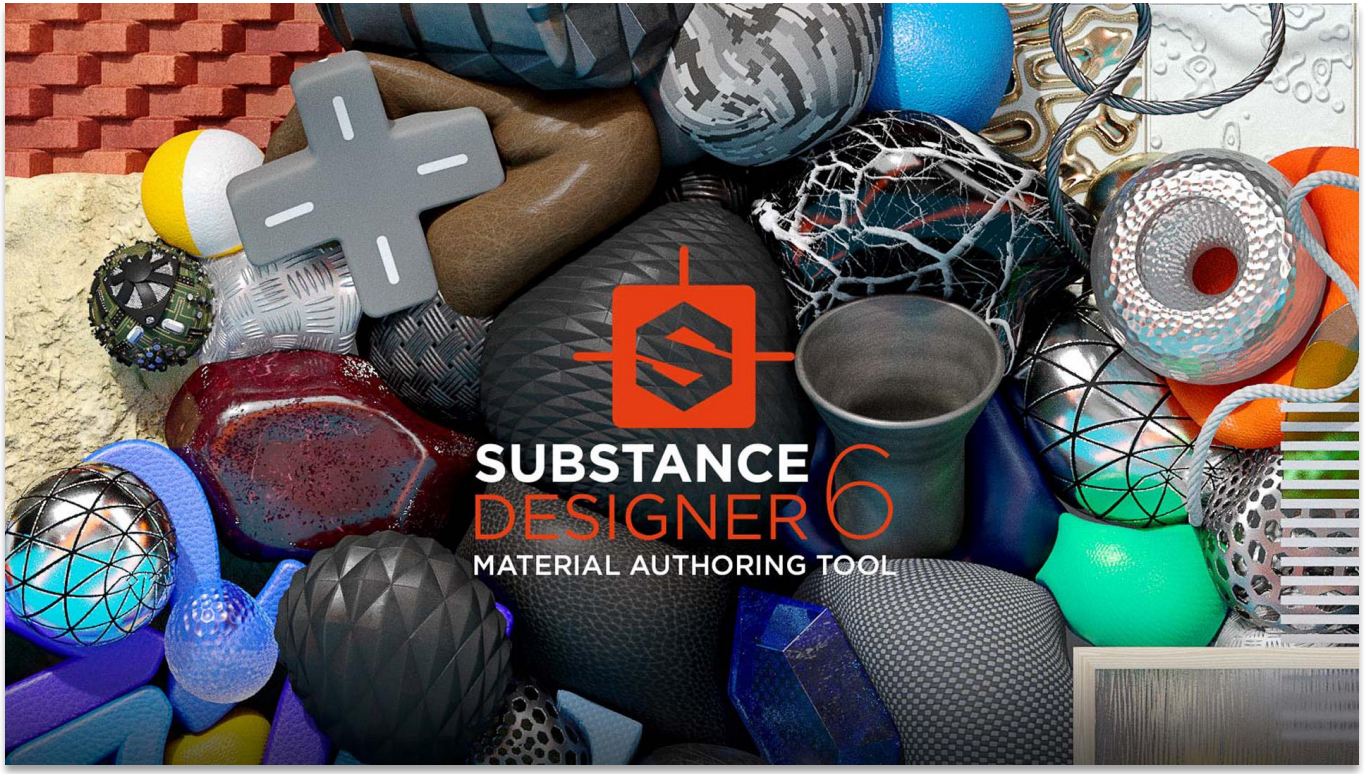
OptiX Builder
- Generates material traversers (CUDA C++)
- Compiles bindless callable programs

MDL SDK | OptiX | NVRTC

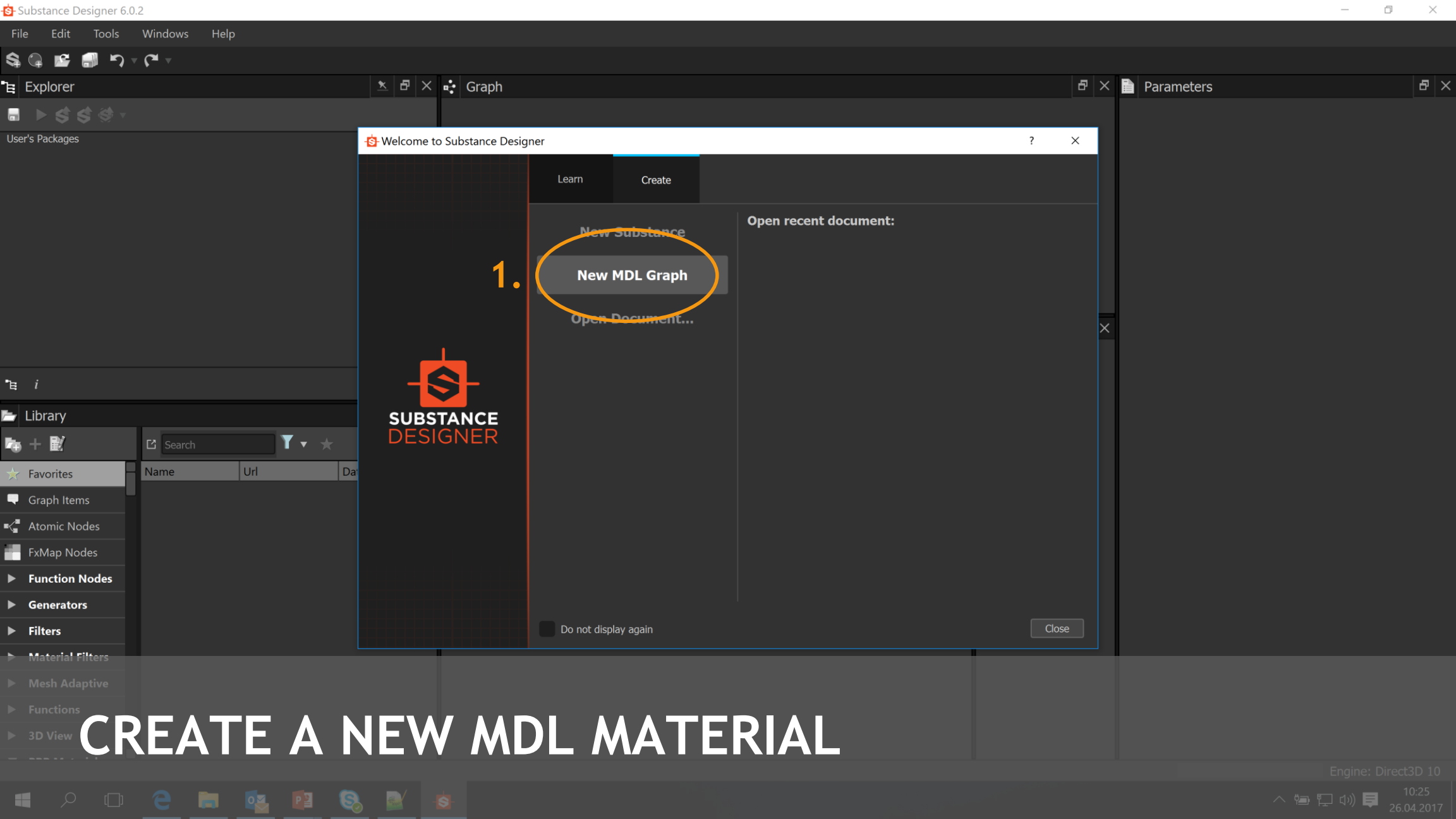
MDL IN CUSTOM RENDERERS



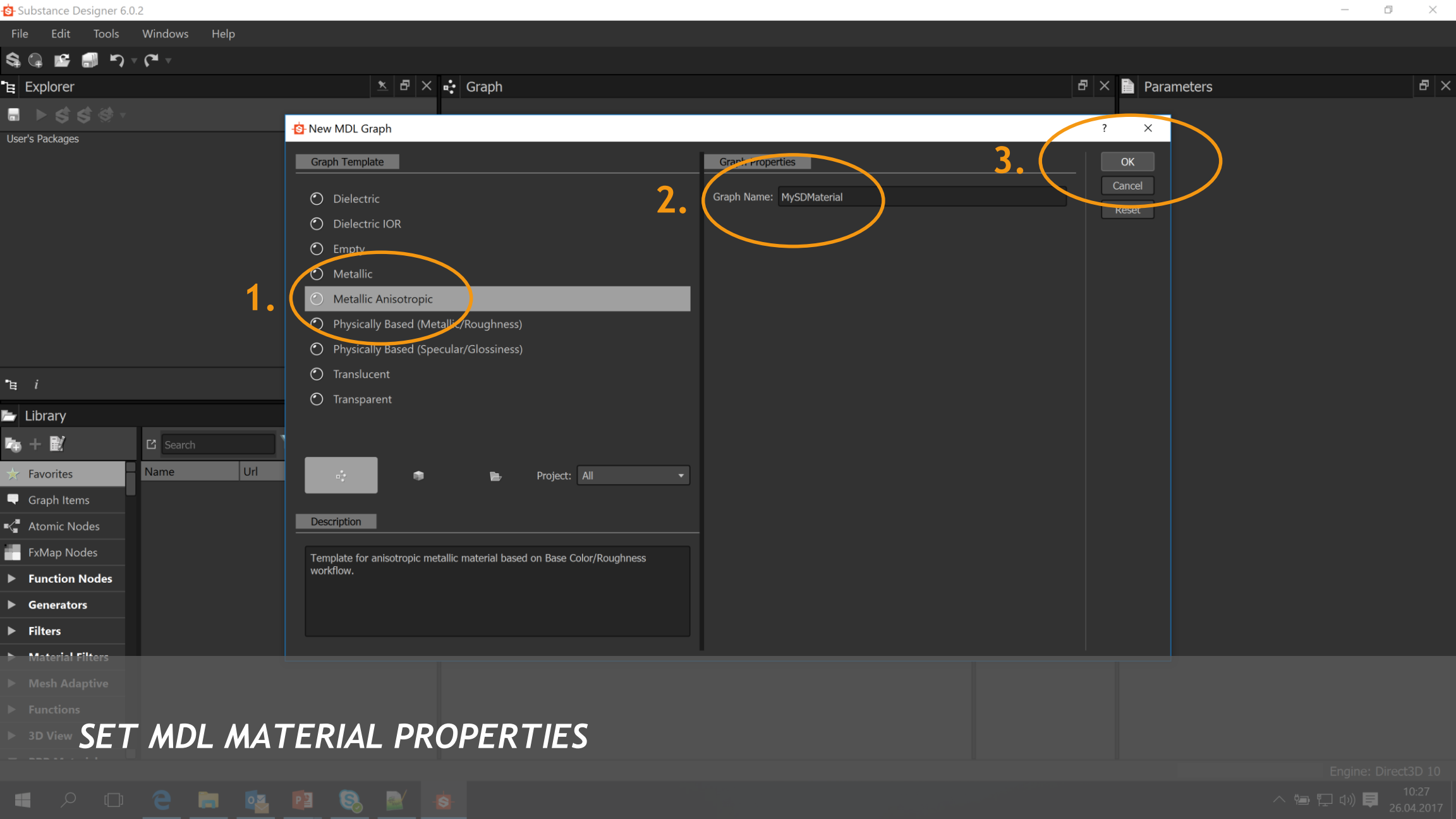
LIVE DEMONSTRATION



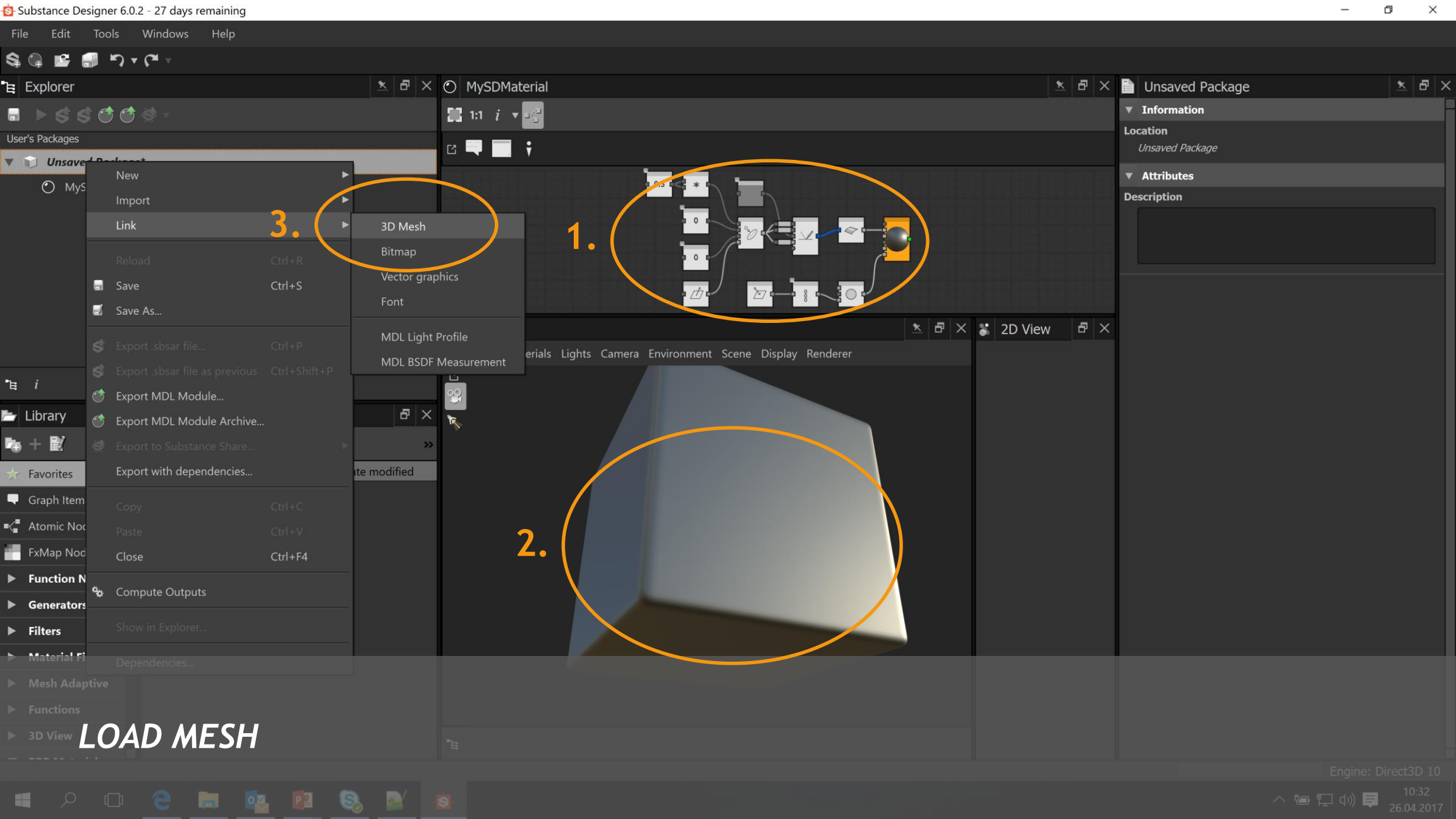
START SD6



CREATE A NEW MDL MATERIAL



SET MDL MATERIAL PROPERTIES


Substance Designer 6.0.2 - 27 days remaining
File
Edit
Tools
Windows
Help
Explorer
User's Packages
Unsaved Package
New
Import
Link
Reload Ctrl+R
Save Ctrl+S
Save As...
Export .sbsar file... Ctrl+P
Export .sbsar file as previous Ctrl+Shift+P
Export MDL Module...
Export MDL Module Archive...
Export to Substance Share...
Export with dependencies...
Copy Ctrl+C
Paste Ctrl+V
Close Ctrl+F4
Compute Outputs
Show in Explorer...
Dependencies...
3D Mesh
Bitmap
Vector graphics
Font
MDL Light Profile
MDL BSDF Measurement
3.
1.
2.
MySDMaterial
Lights
Camera
Environment
Scene
Display
Renderer
2D View
Library
Favorites
Graph Item
Atomic Nod
FxMap Nod
Function N
Generators
Filters
Mesh Adaptive
Functions
3D View
Unsaved Package
Information
Location
Unsaved Package
Attributes
Description
LOAD MESH
Engine: Direct3D 10
10:32
26.04.2017

Substance Designer 6.0.2 - 27 days remaining

File Edit Tools Windows Help

Explorer

User's Packages

Unsaved Package*

MySDMaterial

Resources

1. mitsuba

Library

Search

Favorites

Graph Items

Atomic Nodes

FxMap Nodes

Function Nodes

Generators

Filters

Material Filters

Mesh Adaptive

Functions

3D View

Name | Url | Date modified

MySDMaterial

1:1

3D View

Geometry Materials Lights Camera Environment Scene Display Renderer

2D View

mitsuba

Identifier

mitsuba

Description

Category

Label

Author

Author URL

Tags

User Data

Show In Library

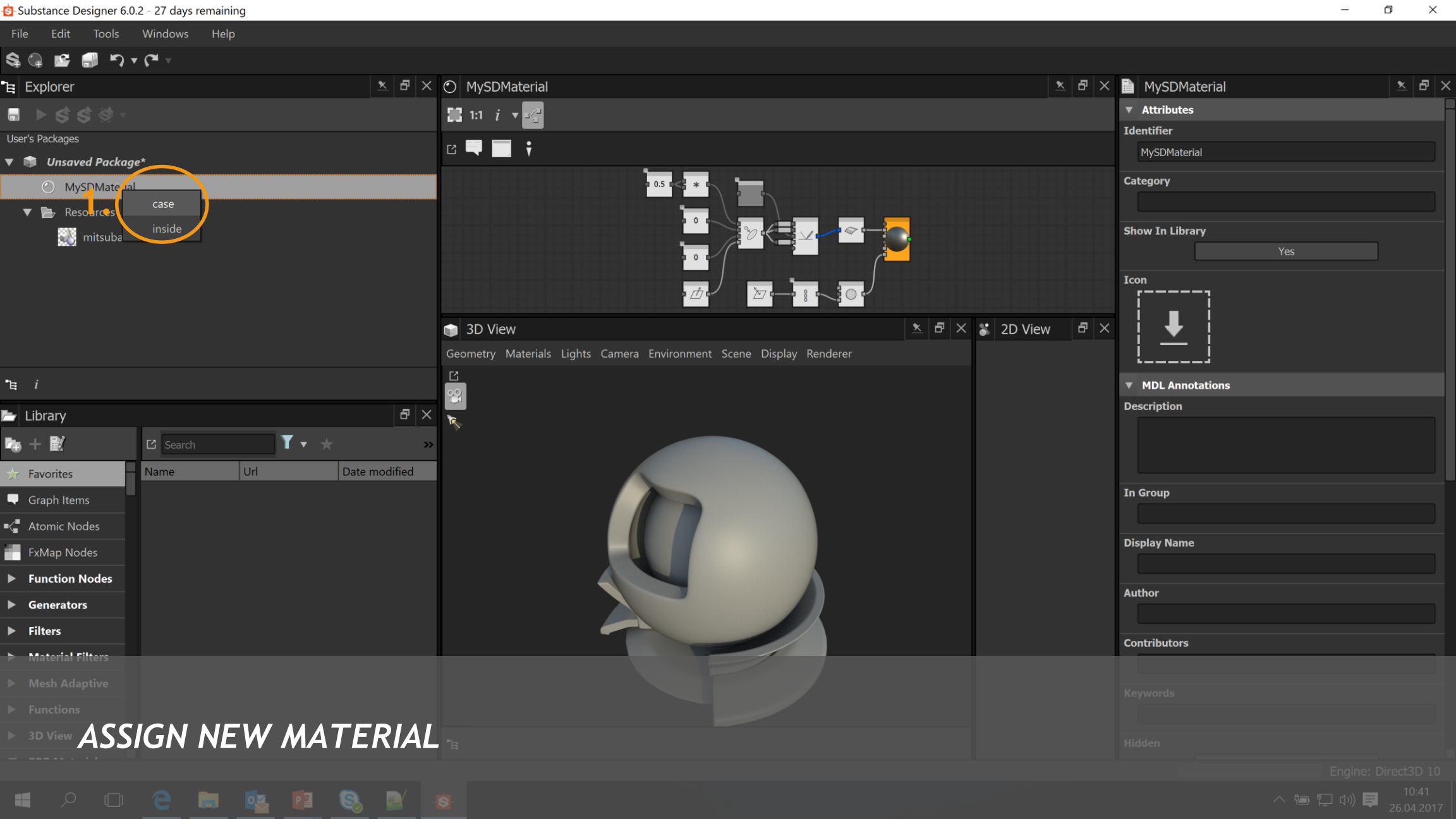
Yes

ACTIVE MESH

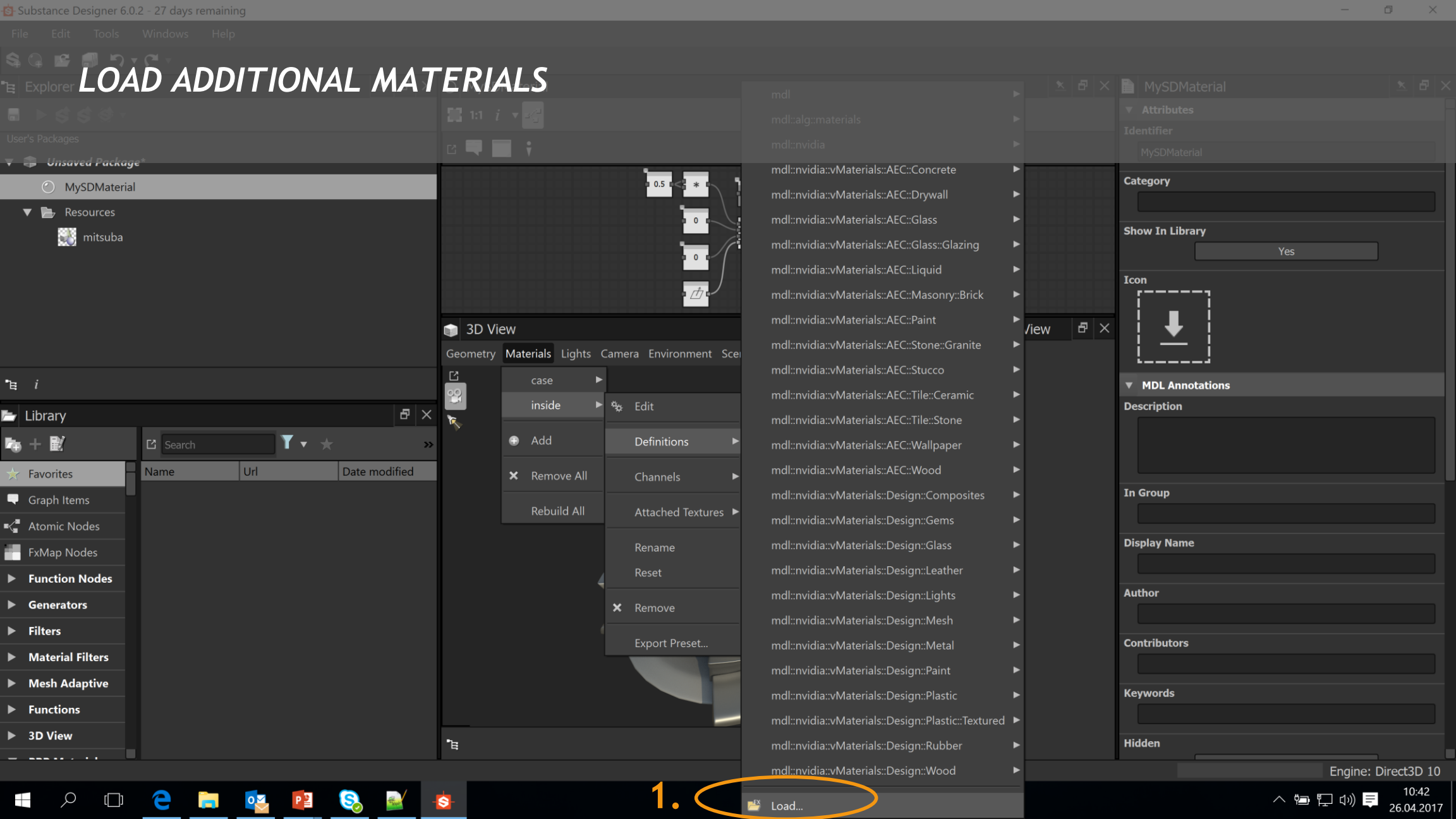
Engine: Direct3D 10

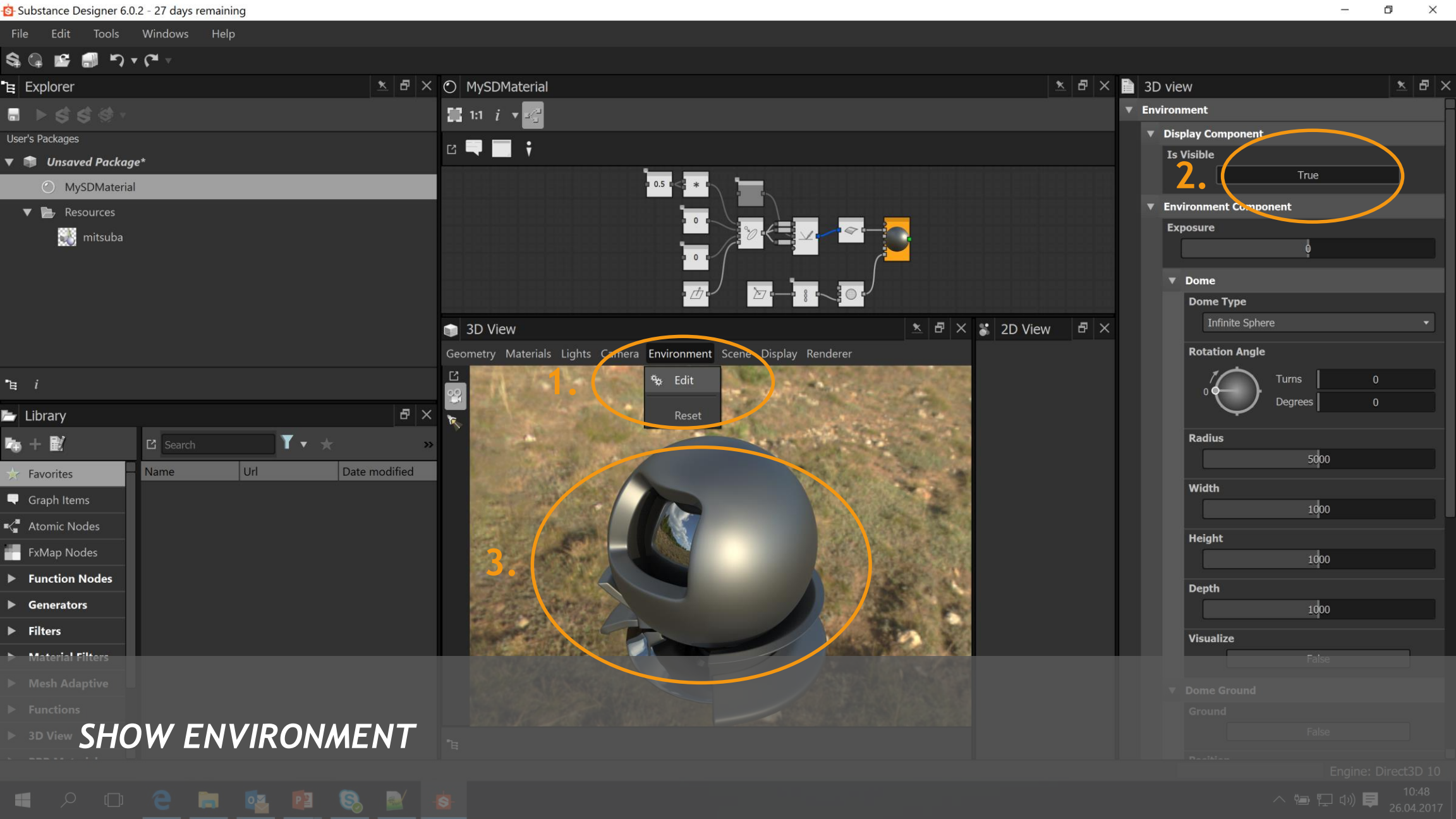
10:38

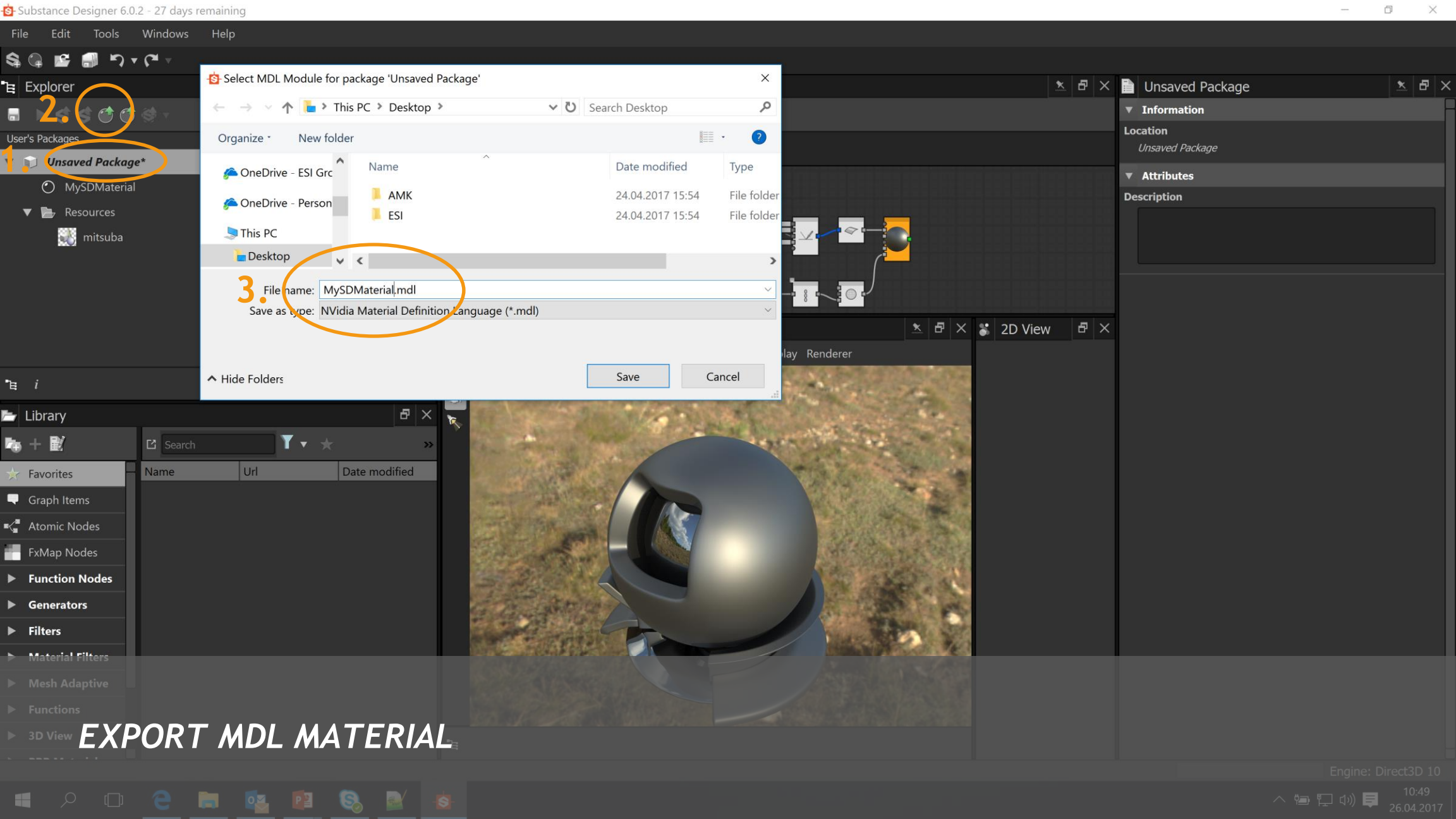
26.04.2017


Substance Designer 6.0.2 - 27 days remaining
File
Edit
Tools
Windows
Help
Explorer
User's Packages
Unsaved Package*
MySDMaterial
Resources
mitsuba
case
inside
1
MySDMaterial
1:1
0.5
0
0
3D View
Geometry
Materials
Lights
Camera
Environment
Scene
Display
Renderer
2D View
MySDMaterial
Attributes
Identifier
MySDMaterial
Category
Show In Library
Yes
Icon
MDL Annotations
Description
In Group
Display Name
Author
Contributors
Keywords
Hidden
Library
Search
Favorites
Graph Items
Atomic Nodes
FxMap Nodes
Function Nodes
Generators
Filters
Material Filters
Mesh Adaptive
Functions
3D View
Name
Url
Date modified
ASSIGN NEW MATERIAL
Engine: Direct3D 10
10:41
26.04.2017

LOAD ADDITIONAL MATERIALS




Substance Designer 6.0.2 - 27 days remaining
File
Edit
Tools
Windows
Help
Explorer
User's Packages
Unsaved Package*
MySDMaterial
Resources
mitsuba
Library
Search
Name
Url
Date modified
Favorites
Graph Items
Atomic Nodes
FxMap Nodes
Function Nodes
Generators
Filters
Material Filters
Mesh Adaptive
Functions
3D View
MySDMaterial
3D View
Geometry
Materials
Lights
Camera
Environment
Scene
Display
Renderer
Edit
Reset
1.
2.
3.
2D View
3D view
Environment
Display Component
Is Visible
True
Environment Component
Exposure
0
Dome
Dome Type
Infinite Sphere
Rotation Angle
Turns
Degrees
Radius
5000
Width
1000
Height
1000
Depth
1000
Visualize
False
Dome Ground
Ground
False
SHOW ENVIRONMENT
Engine: Direct3D 10
10:48
26.04.2017



EXPORT MDL MATERIAL

\\fileserver\amk\Documentation_Conferences\201704 GTC2017_MDL\MySDMaterial.mdl - Notepad++

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?

MySDMaterial.mdl

```
import ::df::microfacet_ggx_smith_bsdf;
import ::df::scatter_mode;
import ::state::normal;
import ::state::texture_tangent_u;

export material MySDMaterial(
    float anisotropyLevel = 0.f [[
        ::anno::description("Anisotropy Level channel"),
        ::anno::hard_range(0,0.999899983),
        ::anno::display_name("Anisotropy Level"),
        ::anno::in_group("Anisotropy")
    ]],
    float roughness = 0.5f [[
        ::anno::display_name("Roughness"),
        ::anno::in_group("Roughness"),
        ::anno::hard_range(0,1)
    ]],
    color base_color = color(0.212231f, 0.212231f, 0.212231f) [[
        ::anno::display_name("Base Color"),
        ::anno::in_group("Base Color")
    ]],
    float anisotropyAngle = 0.f [[
        ::anno::description("Anisotropy Angle channel"),
        ::anno::soft_range(0,1),
        ::anno::display_name("Anisotropy Angle"),
        ::anno::in_group("Anisotropy")
    ]],
    float3 normal = ::state::normal() [[
        ::anno::display_name("Normal"),
        ::anno::in_group("Normal")
    ]])
[[
    ::anno::author("")
]]
 =
    let {
    bool b0 = false;
```

1.

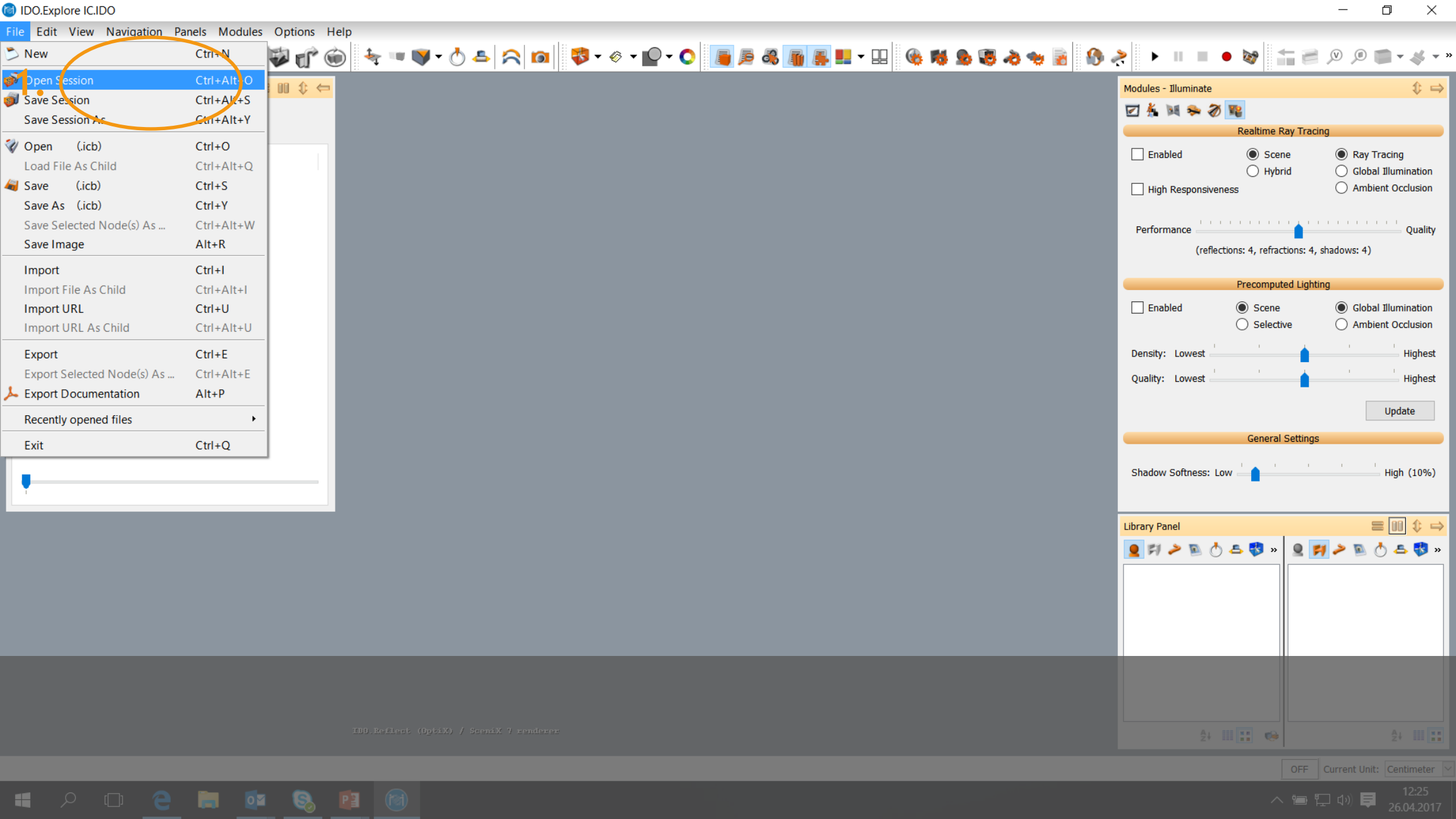
2.

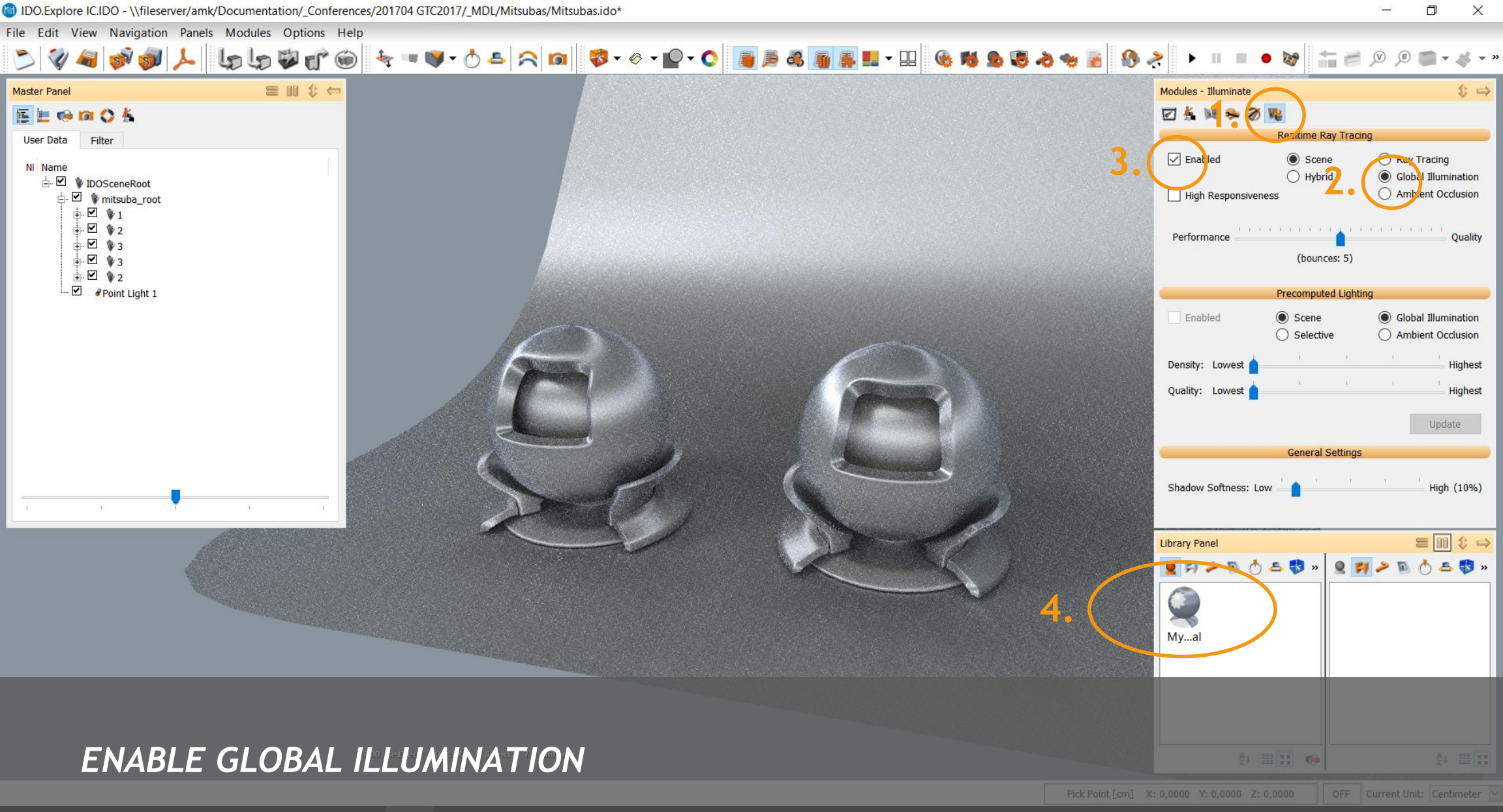
MDL FILE

Normal text file | length : 2748 lines : 68 | Ln : 1 Col : 1 Sel : 0 | 0 | Dos\Windows | UTF-8 | INS

12:13 26.04.2017

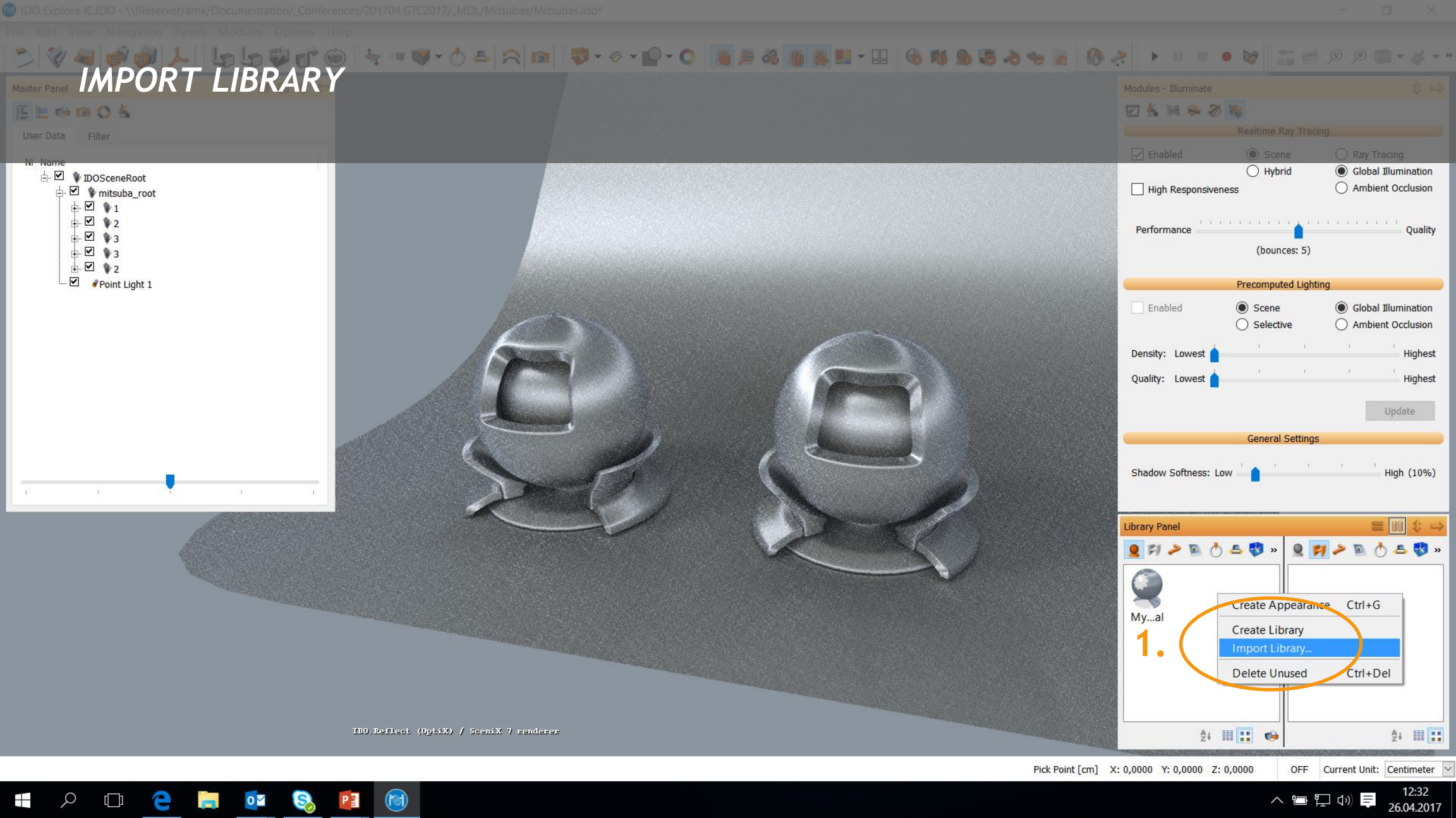
START ICIDO PROOF-OF-CONCEPT

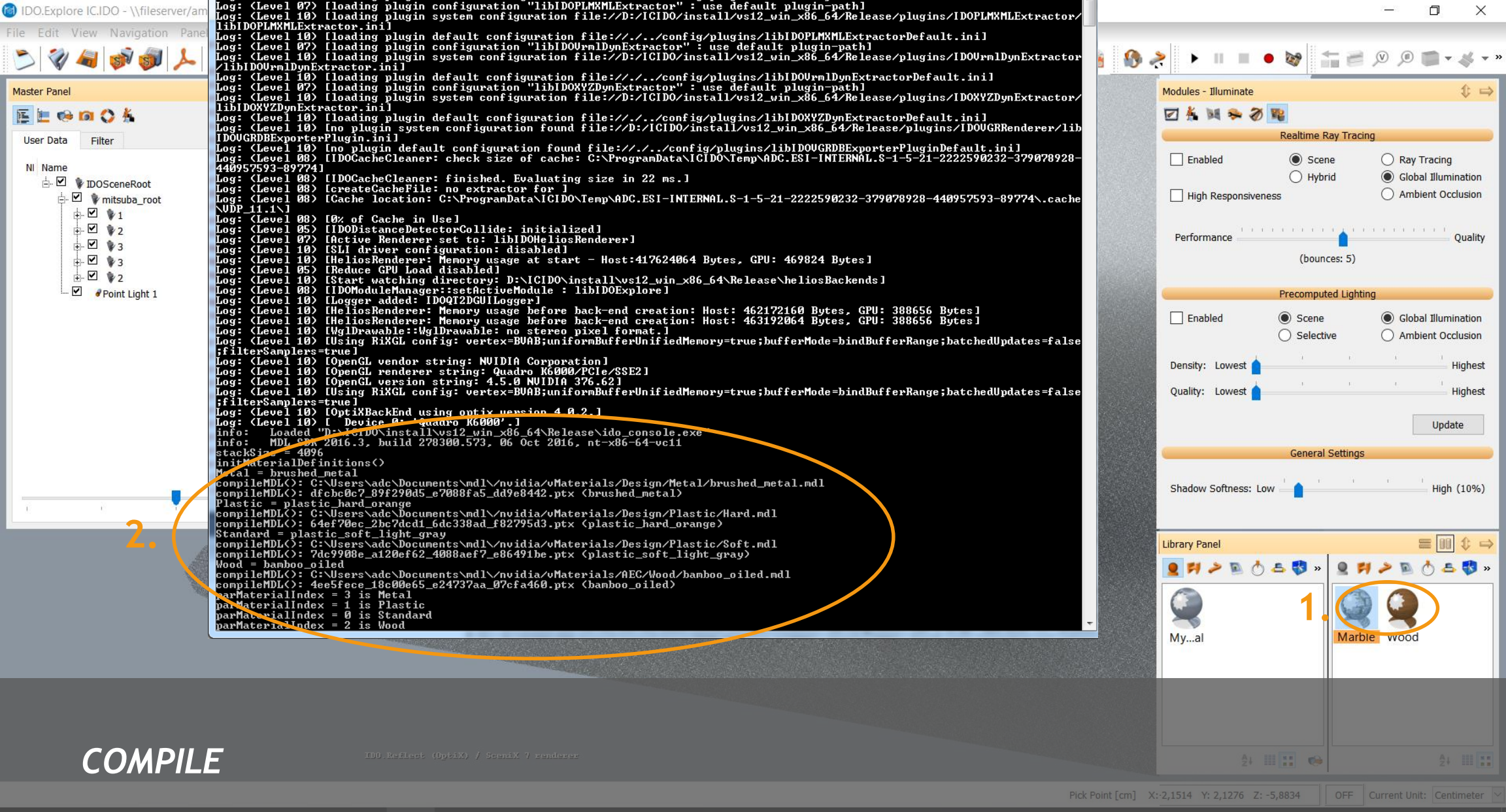

IDO.Explore IC.IDO
File Edit View Navigation Panels Modules Options Help
New Ctrl+N
Open Session Ctrl+Alt+O
Save Session Ctrl+Alt+S
Save Session As Ctrl+Alt+Y
Open (.icb) Ctrl+O
Load File As Child Ctrl+Alt+Q
Save (.icb) Ctrl+S
Save As (.icb) Ctrl+Y
Save Selected Node(s) As ... Ctrl+Alt+W
Save Image Alt+R
Import Ctrl+I
Import File As Child Ctrl+Alt+I
Import URL Ctrl+U
Import URL As Child Ctrl+Alt+U
Export Ctrl+E
Export Selected Node(s) As ... Ctrl+Alt+E
Export Documentation Alt+P
Recently opened files
Exit Ctrl+Q
Modules - Illuminate
Realtime Ray Tracing
Enabled
Scene
Ray Tracing
Hybrid
Global Illumination
High Responsiveness
Ambient Occlusion
Performance
Quality
(reflections: 4, refractions: 4, shadows: 4)
Precomputed Lighting
Enabled
Scene
Global Illumination
Selective
Ambient Occlusion
Density: Lowest
Highest
Quality: Lowest
Highest
Update
General Settings
Shadow Softness: Low
High (10%)
Library Panel
OFF
Current Unit: Centimeter
12:25
26.04.2017



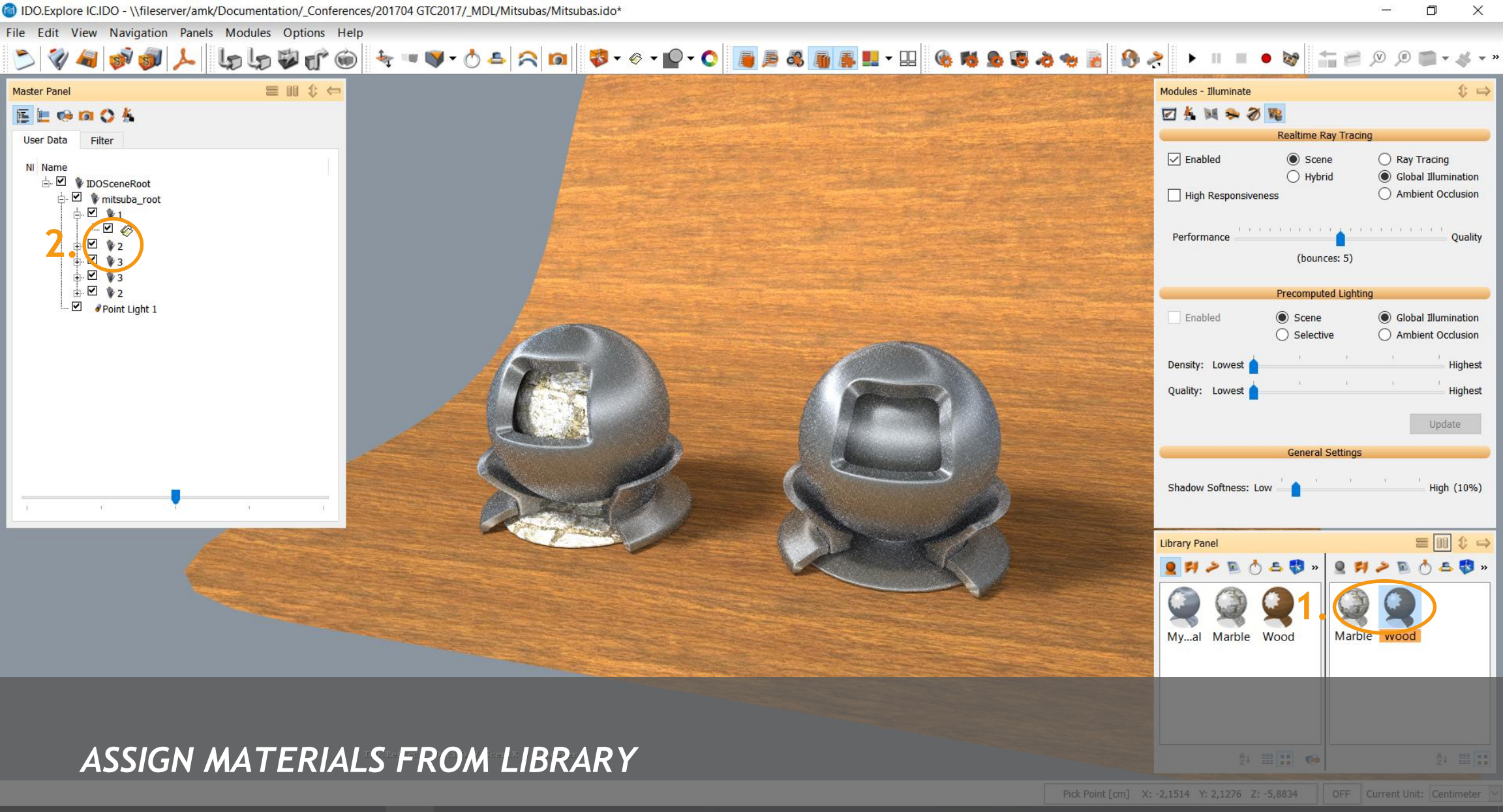
ENABLE GLOBAL ILLUMINATION

IMPORT LIBRARY

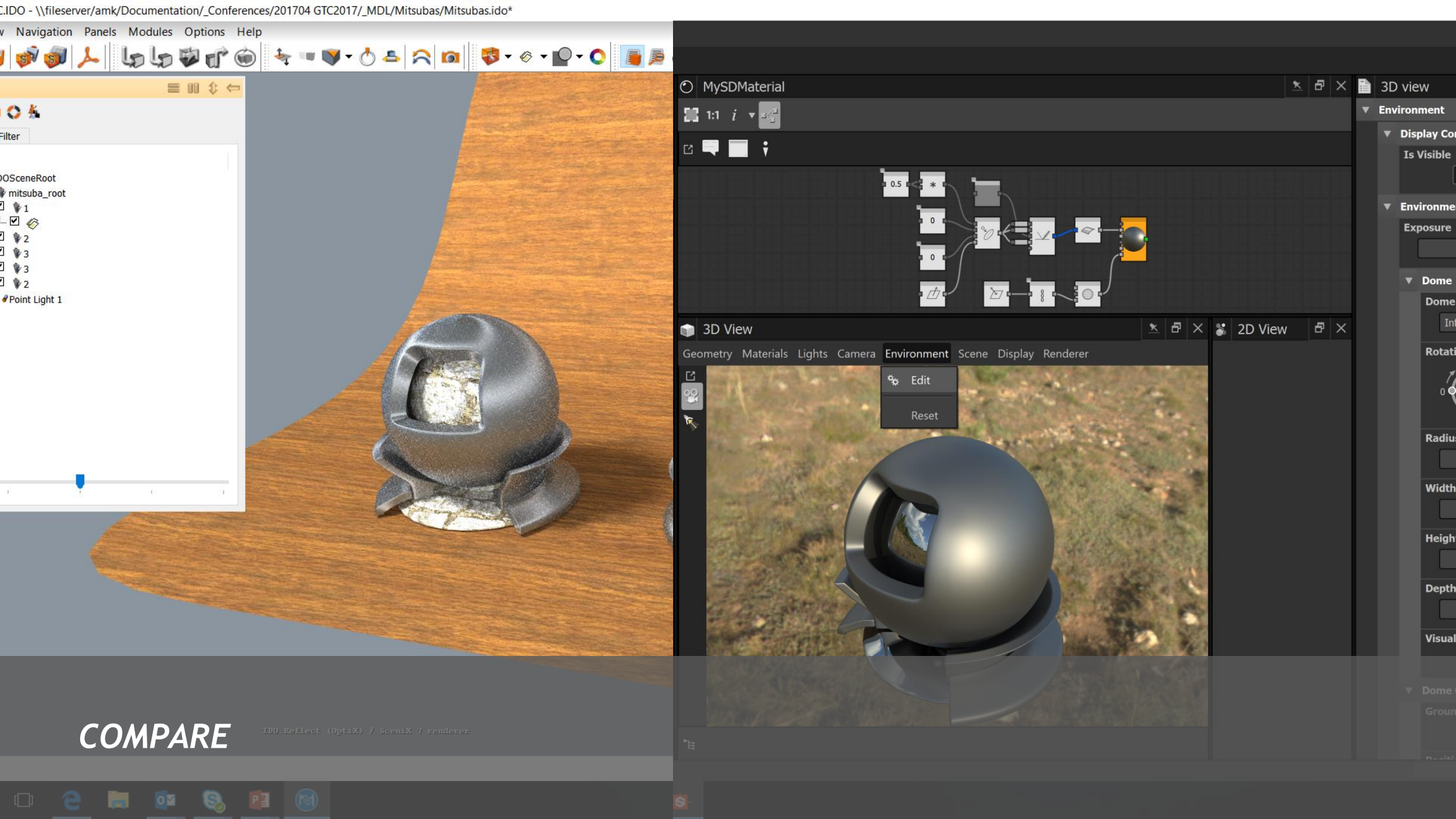



IDO.Explore IC.IDO - \\fileserver/am
File Edit View Navigation Panel
Master Panel
User Data
Filter
Name
IDOSceneRoot
mitsuba_root
Point Light 1
Log: (Level 07) [loading plugin configuration "libIDOPLMXMLExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOPLMXMLExtractor/libIDOPLMXMLExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOPLMXMLExtractorDefault.ini]
Log: (Level 07) [loading plugin configuration "libIDOVrmlDynExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOVrmlDynExtractor/libIDOVrmlDynExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOVrmlDynExtractorDefault.ini]
Log: (Level 07) [loading plugin configuration "libIDOXYZDynExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOXYZDynExtractor/libIDOXYZDynExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOXYZDynExtractorDefault.ini]
Log: (Level 10) [no plugin system configuration found file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOVGRRenderer/libIDOVGRDBExporterPlugin.ini]
Log: (Level 10) [no plugin default configuration found file://./../config/plugins/libIDOVGRDBExporterPluginDefault.ini]
Log: (Level 08) [IDOCacheCleaner: check size of cache: C:\ProgramData\ICIDO\Temp\ADC.ESI-INTERNAL.S-1-5-21-2222590232-379078928-440957593-89774]
Log: (Level 08) [IDOCacheCleaner: finished. Evaluating size in 22 ms.]
Log: (Level 08) [createCacheFile: no extractor for]
Log: (Level 08) [Cache location: C:\ProgramData\ICIDO\Temp\ADC.ESI-INTERNAL.S-1-5-21-2222590232-379078928-440957593-89774\.cache\VDP_11.1\]
Log: (Level 08) [0% of Cache in Use]
Log: (Level 05) [IDODistanceDetectorCollide: initialized]
Log: (Level 07) [Active Renderer set to: libIDOHeliosRenderer]
Log: (Level 10) [SLI driver configuration: disabled]
Log: (Level 10) [HeliosRenderer: Memory usage at start - Host:417624064 Bytes, GPU: 469824 Bytes]
Log: (Level 05) [Reduce GPU Load disabled]
Log: (Level 10) [Start watching directory: D:\ICIDO\install\vs12_win_x86_64\Release\heliosBackends]
Log: (Level 08) [IDOModuleManager::setActiveModule : libIDOExplore]
Log: (Level 10) [Logger added: IDOQT2DGUILogger]
Log: (Level 10) [HeliosRenderer: Memory usage before back-end creation: Host: 462172160 Bytes, GPU: 388656 Bytes]
Log: (Level 10) [HeliosRenderer: Memory usage before back-end creation: Host: 463192064 Bytes, GPU: 388656 Bytes]
Log: (Level 10) [WglDrawable::WglDrawable: no stereo pixel format.]
Log: (Level 10) [Using RiXGL config: vertex=BVAB;uniformBufferUnifiedMemory=true;bufferMode=bindBufferRange;batchedUpdates=false;filterSamplers=true]
Log: (Level 10) [OpenGL vendor string: NVIDIA Corporation]
Log: (Level 10) [OpenGL renderer string: Quadro K6000/PCIe/SSE2]
Log: (Level 10) [OpenGL version string: 4.5.0 NVIDIA 376.62]
Log: (Level 10) [Using RiXGL config: vertex=BVAB;uniformBufferUnifiedMemory=true;bufferMode=bindBufferRange;batchedUpdates=false;filterSamplers=true]
Log: (Level 10) [OptiXBackEnd using optix version 4.0.2.]
Log: (Level 10) [Device 0: 'Quadro K6000'.]
info: Loaded "D:\ICIDO\install\vs12_win_x86_64\Release\ido_console.exe"
info: MDL SDK 2016.3, build 278300.573, 06 Oct 2016, nt-x86-64-vc11
stackSize = 4096
initMaterialDefinitions()
Metal = brushed_metal
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Metal/brushed_metal.mdl
compileMDL(): dfcbc0c7_89f290d5_e7088fa5_dd9e8442.ptx (brushed_metal)
Plastic = plastic_hard_orange
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Plastic/Hard.mdl
compileMDL(): 64ef70ec_2bc7dcd1_6dc338ad_f82795d3.ptx (plastic_hard_orange)
Standard = plastic_soft_light_gray
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Plastic/Soft.mdl
compileMDL(): 7dc9908e_a120ef62_4088aef7_e86491be.ptx (plastic_soft_light_gray)
Wood = bamboo_oiled
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/AEC/Wood/bamboo_oiled.mdl
compileMDL(): 4ee5fece_18c00e65_e24737aa_07cfa460.ptx (bamboo_oiled)
parMaterialIndex = 3 is Metal
parMaterialIndex = 1 is Plastic
parMaterialIndex = 0 is Standard
parMaterialIndex = 2 is Wood
2.
Modules - Illuminate
Realtime Ray Tracing
Enabled
Scene
Ray Tracing
Hybrid
Global Illumination
High Responsiveness
Ambient Occlusion
Performance
Quality
(bounces: 5)
Precomputed Lighting
Enabled
Scene
Global Illumination
Selective
Ambient Occlusion
Density: Lowest
Highest
Quality: Lowest
Highest
Update
General Settings
Shadow Softness: Low
High (10%)
Library Panel
My...al
1.
Marble
wood
Pick Point [cm] X:-2,1514 Y: 2,1276 Z: -5,8834
OFF
Current Unit: Centimeter
12:39
26.04.2017

COMPILE



ASSIGN MATERIALS FROM LIBRARY


C.IDO - \\fileserver/amk/Documentation/_Conferences/201704 GTC2017/_MDL/Mitsubas/Mitsubas.ido*
Navigation
Panels
Modules
Options
Help
Filter
DOSceneRoot
mitsuba_root
Point Light 1
MySDMaterial
1:1
3D View
Geometry
Materials
Lights
Camera
Environment
Scene
Display
Renderer
Edit
Reset
2D View
3D view
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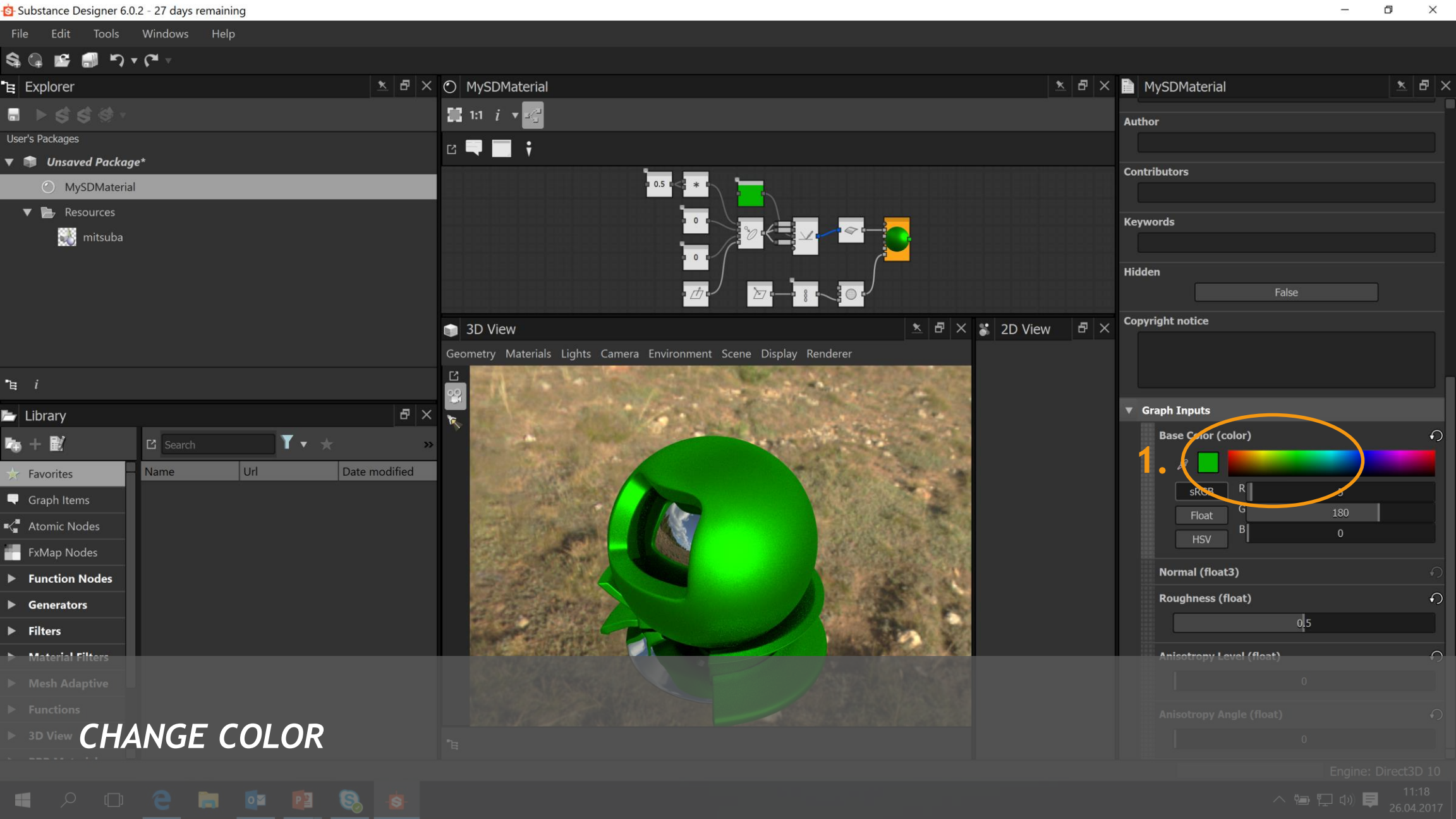
COMPARE



CHANGE COLOR

\\fileserver\amk\Documentation_Conferences\201704 GTC2017_MDL\Unsaved_Package.mdl - Notepad++

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?

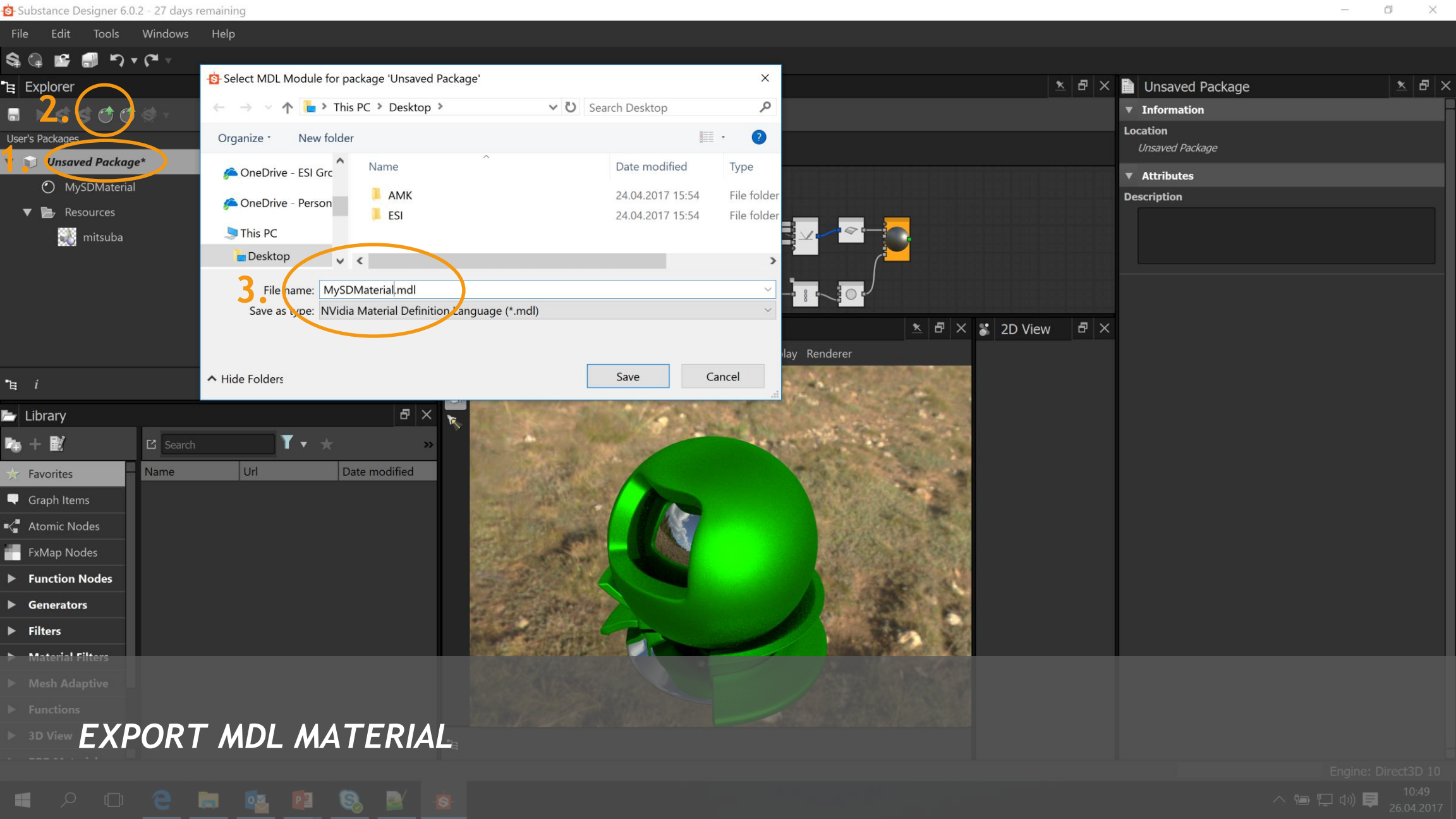
Unsaved_Package.mdl

```
        ::anno::display_name("Anisotropy Level"),
        ::anno::in_group("Anisotropy")
    ]],
    float roughness = 0.5f [[
        ::anno::display_name("Roughness"),
        ::anno::in_group("Roughness"),
        ::anno::hard_range(0,1)
    ]],
    color base_color = color(0.f, 0.401978f, 0.00917f) [[
        ::anno::display_name("Base Color"),
        ::anno::in_group("Base Color")
    ]],
    float anisotropyAngle = 0.f [[
        ::anno::description("Anisotropy Angle channel"),
        ::anno::soft_range(0,1),
        ::anno::display_name("Anisotropy Angle"),
        ::anno::in_group("Anisotropy")
    ]],
    float3 normal = ::state::normal() [[
        ::anno::display_name("Normal"),
        ::anno::in_group("Normal")
    ]])
[[
    ::anno::author("")
]]
 =
    let {
        bool tmp0 = false;
        material_surface tmp1(
            ::df::microfacet_ggx_smith_bsdf(::base::anisotropy_conversion(roughness * roughness, anisotropyLevel, anisotropyAngle, ::state::texture_tange
            material_emission(emission: edf(), intensity: color(0.f, 0.f, 0.f), mode: intensity_radiant_exitance));
        material_surface tmp2 = material_surface(scattering: bsdf(), emission: material_emission(emission: edf(), intensity: color(0.f, 0.f, 0.f), mode:
        color tmp3 = color(1.f, 1.f, 1.f);
        material_volume tmp4 = material_volume(scattering: vdf(), absorption_coefficient: color(0.f, 0.f, 0.f), scattering_coefficient: color(0.f, 0.f, (
        material_geometry tmp5(
            float3(0.f),
            1.f,
```

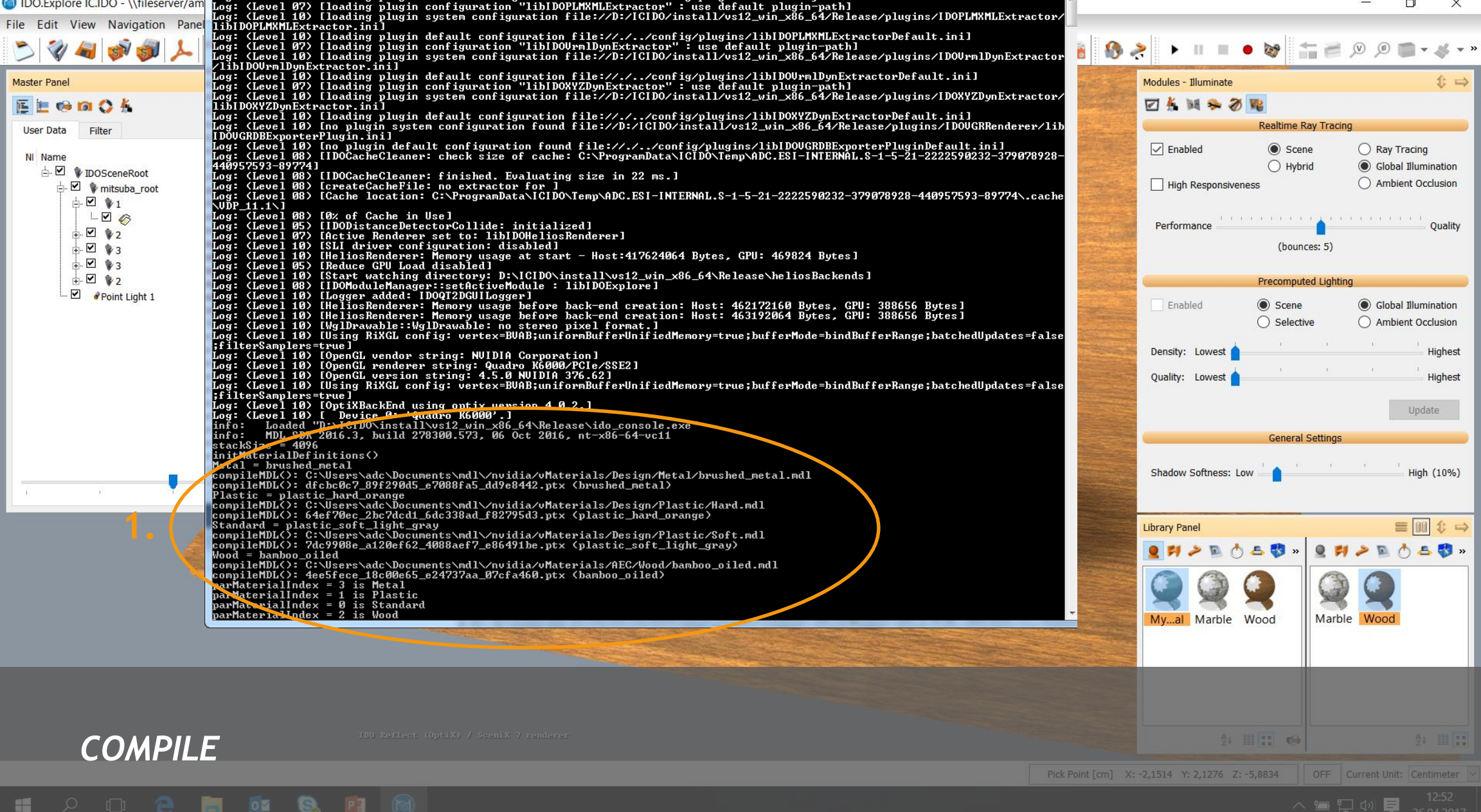
1.

Normal text file | length : 2741 lines : 68 | Ln : 1 Col : 1 Sel : 0 | 0 | Dos\Windows | UTF-8 | INS

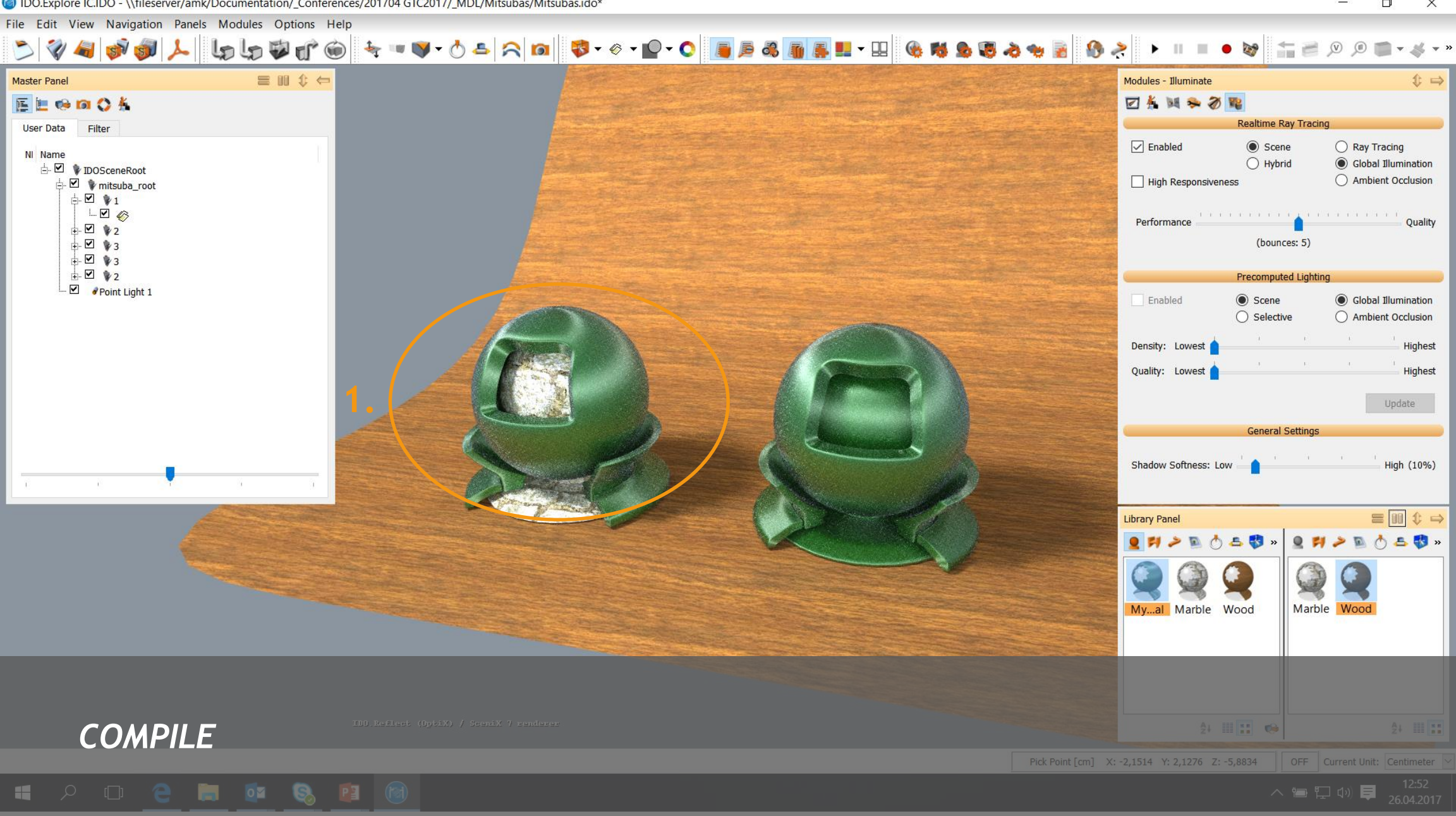
12:15 26.04.2017



EXPORT MDL MATERIAL


IDO.Explore IC.IDO - \\fileserver/am
File Edit View Navigation Panel
Master Panel
User Data
Filter
Name
IDOSceneRoot
mitsuba_root
Point Light 1
Log: (Level 07) [loading plugin configuration "libIDOPLMXMLExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOPLMXMLExtractor/libIDOPLMXMLExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOPLMXMLExtractorDefault.ini]
Log: (Level 07) [loading plugin configuration "libIDOVrmlDynExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOVrmlDynExtractor/libIDOVrmlDynExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOVrmlDynExtractorDefault.ini]
Log: (Level 07) [loading plugin configuration "libIDOXYZDynExtractor" : use default plugin-path]
Log: (Level 10) [loading plugin system configuration file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOXYZDynExtractor/libIDOXYZDynExtractor.ini]
Log: (Level 10) [loading plugin default configuration file://./../config/plugins/libIDOXYZDynExtractorDefault.ini]
Log: (Level 10) [no plugin system configuration found file://D:/ICIDO/install/vs12_win_x86_64/Release/plugins/IDOVGRRenderer/libIDOVGRDBExporterPlugin.ini]
Log: (Level 10) [no plugin default configuration found file://./../config/plugins/libIDOVGRDBExporterPluginDefault.ini]
Log: (Level 08) [IDOCacheCleaner: check size of cache: C:\ProgramData\ICIDO\Temp\ADC.ESI-INTERNAL.S-1-5-21-2222590232-379078928-440957593-89774]
Log: (Level 08) [IDOCacheCleaner: finished. Evaluating size in 22 ms.]
Log: (Level 08) [createCacheFile: no extractor for]
Log: (Level 08) [Cache location: C:\ProgramData\ICIDO\Temp\ADC.ESI-INTERNAL.S-1-5-21-2222590232-379078928-440957593-89774\.cache\VDP_11.1\]
Log: (Level 08) [0% of Cache in Use]
Log: (Level 05) [IDODistanceDetectorCollide: initialized]
Log: (Level 07) [Active Renderer set to: libIDOHeliosRenderer]
Log: (Level 10) [SLI driver configuration: disabled]
Log: (Level 10) [HeliosRenderer: Memory usage at start - Host:417624064 Bytes, GPU: 469824 Bytes]
Log: (Level 05) [Reduce GPU Load disabled]
Log: (Level 10) [Start watching directory: D:\ICIDO\install\vs12_win_x86_64\Release\heliosBackends]
Log: (Level 08) [IDOModuleManager::setActiveModule : libIDOExplore]
Log: (Level 10) [Logger added: IDOQT2DGUILogger]
Log: (Level 10) [HeliosRenderer: Memory usage before back-end creation: Host: 462172160 Bytes, GPU: 388656 Bytes]
Log: (Level 10) [HeliosRenderer: Memory usage before back-end creation: Host: 463192064 Bytes, GPU: 388656 Bytes]
Log: (Level 10) [WglDrawable::WglDrawable: no stereo pixel format.]
Log: (Level 10) [Using RiXGL config: vertex=BVAB;uniformBufferUnifiedMemory=true;bufferMode=bindBufferRange;batchedUpdates=false;filterSamplers=true]
Log: (Level 10) [OpenGL vendor string: NVIDIA Corporation]
Log: (Level 10) [OpenGL renderer string: Quadro K6000/PCIe/SSE2]
Log: (Level 10) [OpenGL version string: 4.5.0 NVIDIA 376.62]
Log: (Level 10) [Using RiXGL config: vertex=BVAB;uniformBufferUnifiedMemory=true;bufferMode=bindBufferRange;batchedUpdates=false;filterSamplers=true]
Log: (Level 10) [OptiXBackEnd using optix version 4.0.2.]
Log: (Level 10) [Device 0: 'Quadro K6000'.]
info: Loaded "D:\ICIDO\install\vs12_win_x86_64\Release\ido_console.exe"
info: MDL SDK 2016.3, build 278300.573, 06 Oct 2016, nt-x86-64-vc11
stackSize = 4096
initMaterialDefinitions()
Metal = brushed_metal
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Metal/brushed_metal.mdl
compileMDL(): dfcbc0c7_89f290d5_e7088fa5_dd9e8442.ptx (brushed_metal)
Plastic = plastic_hard_orange
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Plastic/Hard.mdl
compileMDL(): 64ef70ec_2bc7dcd1_6dc338ad_f82795d3.ptx (plastic_hard_orange)
Standard = plastic_soft_light_gray
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/Design/Plastic/Soft.mdl
compileMDL(): 7dc9908e_a120ef62_4088aef7_e86491be.ptx (plastic_soft_light_gray)
Wood = bamboo_oiled
compileMDL(): C:\Users\adc\Documents\mdl\/nvidia/vMaterials/AEC/Wood/bamboo_oiled.mdl
compileMDL(): 4ee5fece_18c00e65_e24737aa_07cfa460.ptx (bamboo_oiled)
parMaterialIndex = 3 is Metal
parMaterialIndex = 1 is Plastic
parMaterialIndex = 0 is Standard
parMaterialIndex = 2 is Wood
1.
Modules - Illuminate
Realtime Ray Tracing
Enabled
Scene
Ray Tracing
Hybrid
Global Illumination
High Responsiveness
Ambient Occlusion
Performance
Quality
(bounces: 5)
Precomputed Lighting
Enabled
Scene
Global Illumination
Selective
Ambient Occlusion
Density: Lowest
Highest
Quality: Lowest
Highest
Update
General Settings
Shadow Softness: Low
High (10%)
Library Panel
My...al
Marble
Wood
Marble
Wood
Pick Point [cm] X: -2,1514 Y: 2,1276 Z: -5,8834
OFF
Current Unit: Centimeter
12:52
26.04.2017

COMPILE


IDO.Explore IC.IDO - \\fileserver\amk\Documentation_Conferences\201704 GTC2017_MDL\Mitsubas\Mitsubas.ido*
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Point Light 1
1.
Modules - Illuminate
Realtime Ray Tracing
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Scene
Ray Tracing
Hybrid
Global Illumination
High Responsiveness
Ambient Occlusion
Performance
Quality
(bounces: 5)
Precomputed Lighting
Enabled
Scene
Global Illumination
Selective
Ambient Occlusion
Density: Lowest
Highest
Quality: Lowest
Highest
Update
General Settings
Shadow Softness: Low
High (10%)
Library Panel
My...al
Marble
Wood
Marble
Wood
COMPILE
Pick Point [cm] X: -2,1514 Y: 2,1276 Z: -5,8834
OFF
Current Unit: Centimeter
12:52
26.04.2017

GPU TECHNOLOGY CONFERENCE

May 8-11, 2017 | Silicon Valley

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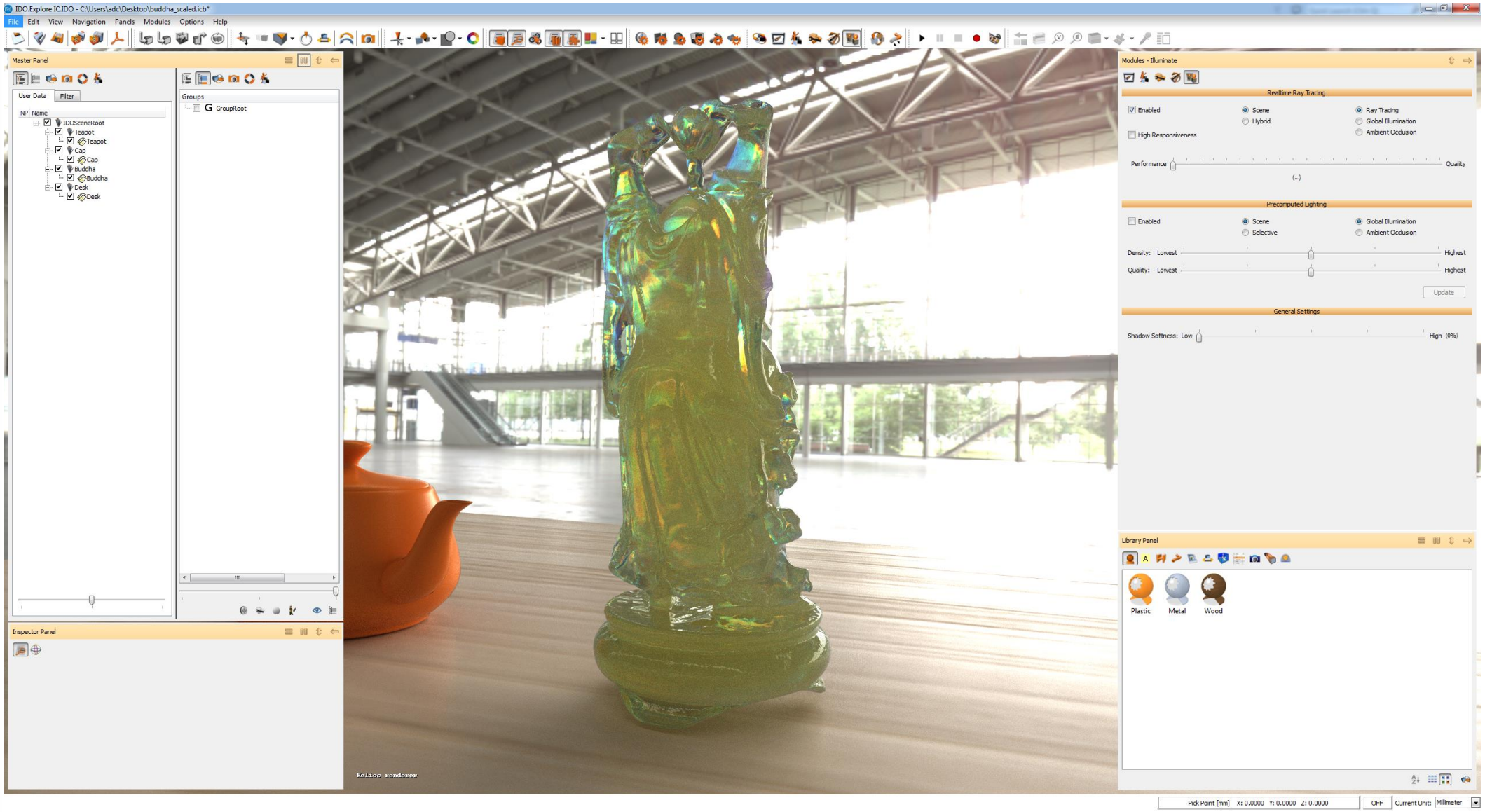
IDO.Explore IC.IDO - C:\Users\adc\Desktop\buddha_scaled.icb*
File Edit View Navigation Panels Modules Options Help
Master Panel
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Teapot
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Buddha
Desk
Groups
GroupRoot
Inspector Panel
Modules - Illuminate
Realtime Ray Tracing
Enabled
Scene
Hybrid
Ray Tracing
Global Illumination
Ambient Occlusion
High Responsiveness
Performance
Quality
Precomputed Lighting
Enabled
Scene
Selective
Global Illumination
Ambient Occlusion
Density: Lowest
Highest
Quality: Lowest
Highest
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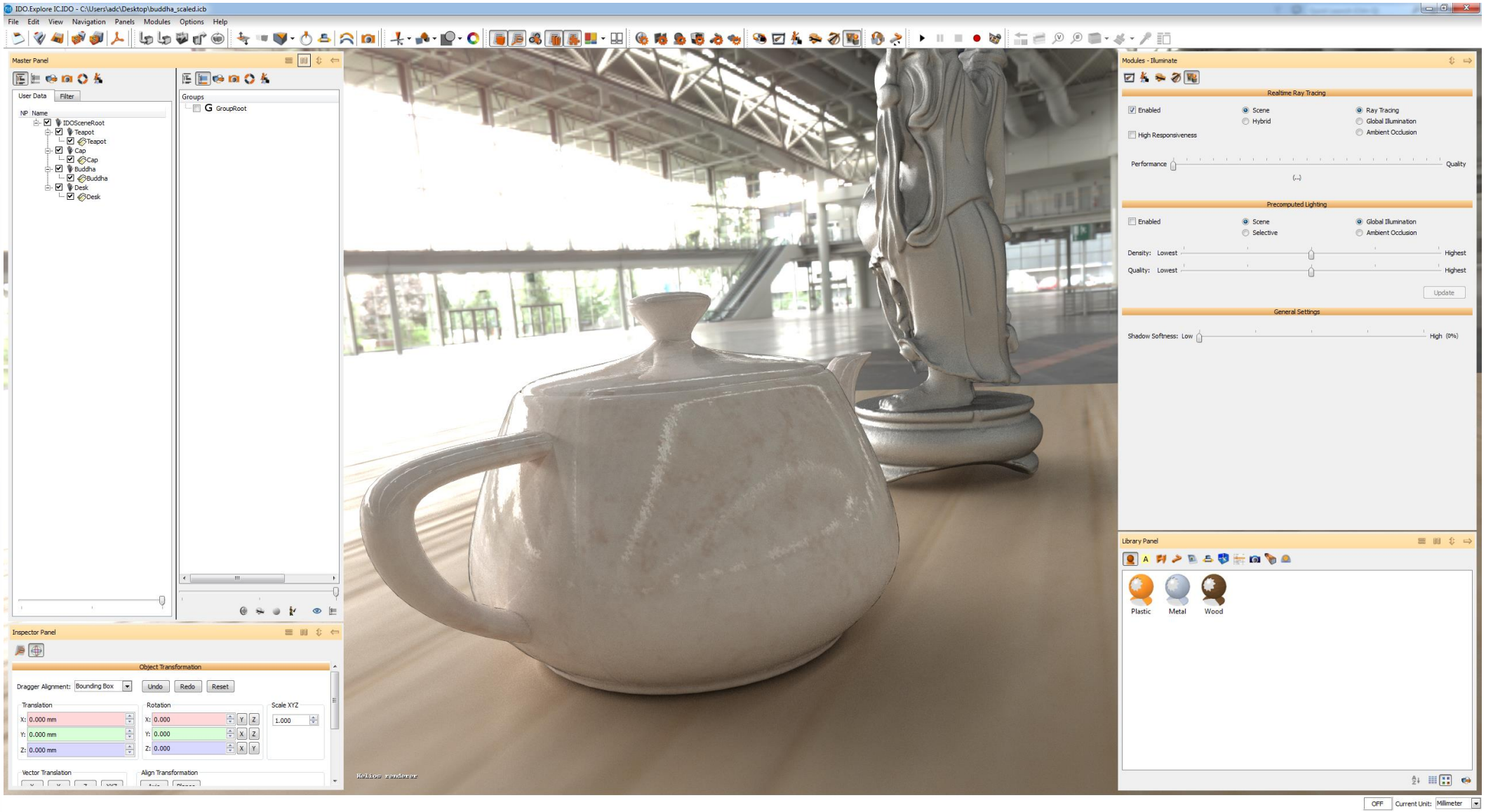
General Settings
Shadow Softness: Low
High (0%)
Library Panel
Plastic
Metal
Wood
Helios renderer
Pick Point [mm] X: 0.0000 Y: 0.0000 Z: 0.0000
OFF
Current Unit: Milimeter


IDO.Explore IC.IDO - C:\Users\adc\Desktop\buddha_scaled.icb
File Edit View Navigation Panels Modules Options Help
Master Panel
User Data
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NP Name
IDOSceneRoot
Teapot
Cap
Buddha
Desk
Groups
GroupRoot
Inspector Panel
Object Transformation
Dragger Alignment: Bounding Box
Undo
Redo
Reset
Translation
Rotation
Scale XYZ
Vector Translation
Align Transformation
Helios renderer
Modules - Illuminate
Realtime Ray Tracing
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Scene
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Ray Tracing
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Quality
Precomputed Lighting
Selective
Density: Lowest
Highest
Quality: Lowest
Update
General Settings
Shadow Softness: Low
High (0%)
Library Panel
Plastic
Metal
Wood
OFF
Current Unit: Millimeter