



# AUTODESK UNIVERSITY 2015

AV10255

## Demystifying real-time material work flows for Stingray

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### Learning Objectives

- Deconstruct and understand the basic elements of PBR Shaders
- Learn how to assemble basic PBR shader networks
- Discover how and when to use various materials for different workflows
- Learn how to use appropriate methods for texture maps editing and generation

### Description

With the introduction of Stingray 3D game engine, multitudes of new workflows are now possible. This class will explore and demystify the material workflows from 3ds Max software and Maya software to Stingray software. Simple materials are easy, but if you really want to capitalize on all Stingray has to offer you need to understand the basics of Shader FX and the new Stingray/PBR (physically based rendering). Much of this material will also be applicable in Unity and Unreal workflows.

### Your AU Experts

*Chris Murray is a production veteran, experienced instructor, published author, and kid that never grew up. He has created digital 3D content for clients such as CNN.com, Walt Disney Attractions, Johnson & Johnson, CanonUSA, ABC television, Nickelodeon, and Sega. Murray has maintained a career-long relationship with learning. He was guest instructor in the School of Film and Digital Media at the University of Central Florida and was a department chair in Digital Production at Full Sail University. Now he's living one of his dreams at Autodesk as a technical marketing specialist playing with his favorite toys, the 3ds Max® suite of tools. Chris is an experienced presenter (conferences, trade shows, universities, and corporations) and has authored a book, Mastering 3D Studio Max. He holds an MFA in computer animation. Follow Chris on Twitter @chrismurray.*

## Top 5 things you need to know about PBR materials vs. other materials

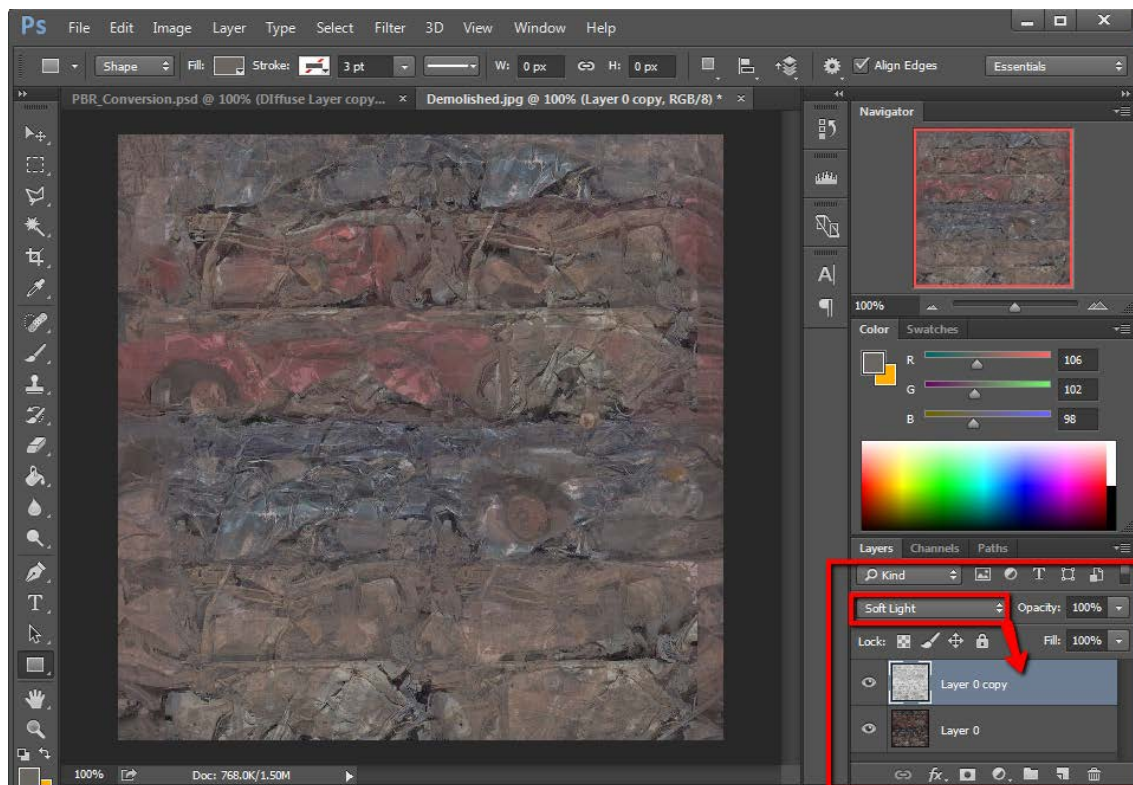
1. PBR is a physically-based shading method to be used in Real time game engines to allow for as much realism as possible in any lighting condition. It's a code based shader that defines how a surface is seen within a given lighting condition
2. There are basically two unique workflows for creating PBR materials. Specular/Glossiness work flows or the Metalness/Roughness workflow. The two are not interchangeable. The Autodesk Stingray Shader uses the Metalness workflow.
3. PBR uses different Texture maps than standard rendered workflows. Some maps from those workflows can be used, but some need to be created exclusively for PBR
4. Reference charts with many of the most common surface property settings are readily available online and included in this hand out.
5. In 3ds Max, the (PBR) Stingray Shader doesn't operate the same way as other types of materials you may be used to. Remember, the Stingray shader is a SHADER. It's a chunk of code to be read by another program. Its not a material per se.



# How to manually convert a diffuse map to an albedo map.

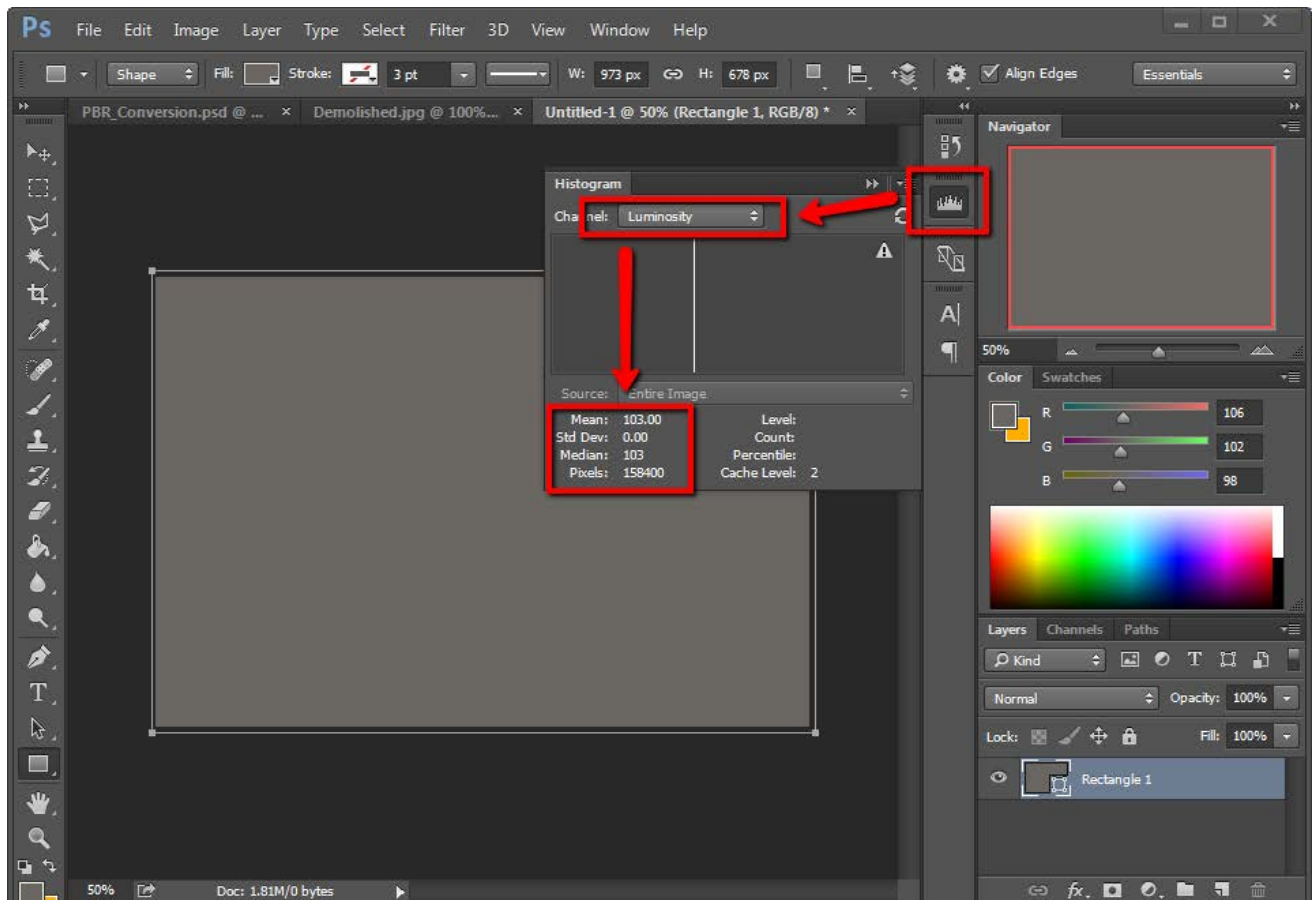
## Remove Shadows and Highlights

1. Load your diffuse map into Photoshop
2. Duplicate the layer
3. Remove all saturation from the new layer (Ctrl+U)
4. Invert the new layer (Ctrl+I)
5. Change the blending mode to “Softlight”



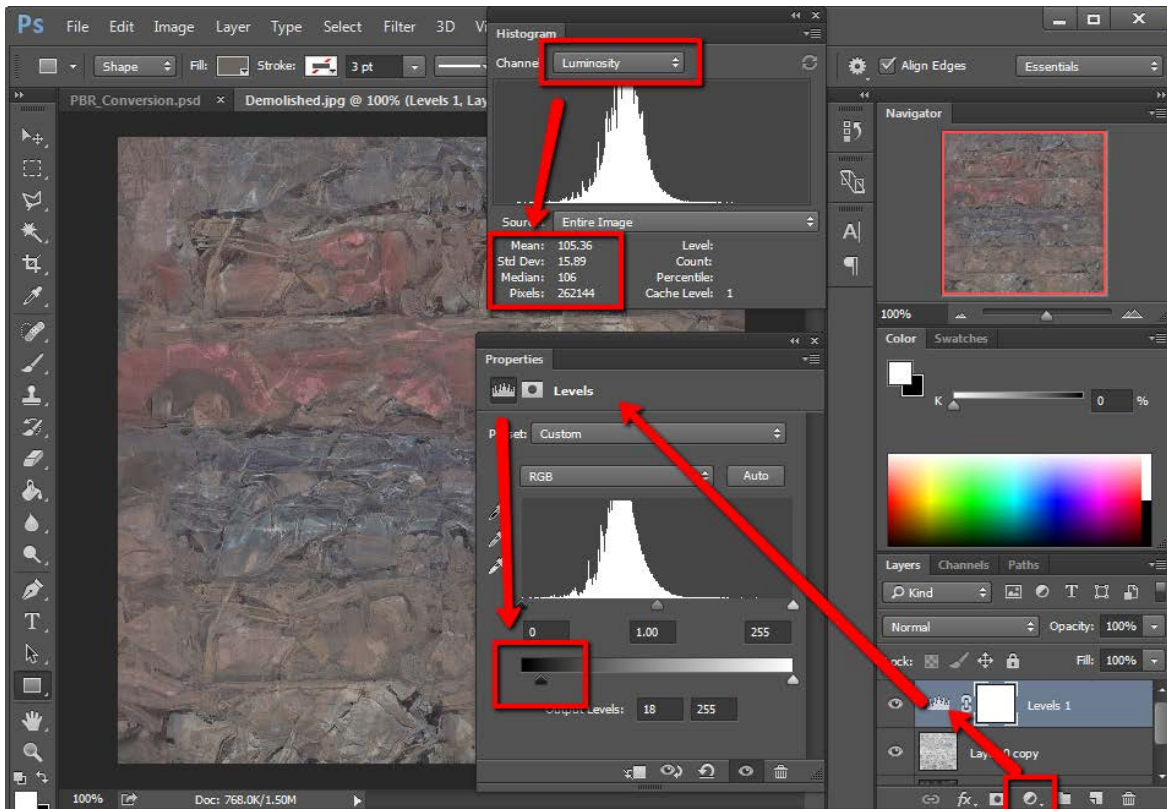
## Acquire the proper luminosity

6. Open one of the color reference charts that contains the type of material you are creating an albedo map for (metal, dielectric, etc...)
7. Sample the base color for that type of Material (make sure the source image is 24 or 32 bit!)
8. Create a new Photoshop document and place a filled rectangle in the document (it should fill with the newly sampled color)
9. Open the Histogram Palette, change it to “Luminosity mode”. This will give you the proper luminosity value for the desired material type.



## Adjust the edited texture map to the correct luminosity

10. Switch back to your first image
11. Open the Histogram palette (if isn't still open) and switch to luminosity mode.
12. On the top layer, add a "Levels" adjustment layer
13. Make sure you can see both the Histogram and the levels settings.
14. Adjust the sliders on the Levels palette to modify the luminosity of the new Albedo Map.
15. DONE! Save as a TGA or PNG to maintain color integrity



# Reference charts

NOTE: Do not use these images to sample from.

To get the source images go here:

<http://www.marmoset.co/toolbag/learn/pbr-practice>


<https://seblagarde.wordpress.com/2014/04/14/dontnod-physically-based-rendering-chart-for-unreal-engine-4/>

<https://seblagarde.wordpress.com/2012/04/30/dontnod-specular-and-glossiness-chart/>

material values chart [www.marmoset.co/toolbag/learn](http://www.marmoset.co/toolbag/learn)

canvas	rubber	plaster	brick	rock	dirt	coal
rust	leaves	satin	wood	concrete	plastic (rough)	mud
painted metal	ceramic	plastic (glossy)	brushed metal	rough steel	gold	chrome

a = albedo (sRGB)
m = microsurface (linear)
r = reflectivity (sRGB)



Source: Marmoset

**DONTNOD**  
ENTERTAINMENT

**Base Color (sRGB)**

unit: Median Luminosity

	Coal: 50		Bricks: 131
	Forged Iron: 57		Old concrete: 135
	Dark soil: 67		Grey Painting: 163
	Worn asphalt: 92		Sand: 166
	Varnished Wood: 101		Clean cement: 181
	Tree Bark: 105		Rough wood: 203
	Green vegetation: 122		Snow: 243
	Grey Plaster: 129		

neutral grey: 186

Gold		Iron		Nickel	
Silver		Copper		Cobalt	
Aluminium		Titanium		Platinum	

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**Metallic (N&B)**

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**Roughness (N&B)**


Metallic

Non metallic

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**Porosity (N&B)**



**DONTM0D**  
ENTERTAINMENT

**Specular (sRGB)**

**No metallic**

Monochrom

Ice  
Water  
Rusted metal  
Glass  
Plastic

Wood, stone, brick, sand, concrete, fabric... can be set within the same range as plastic  
Rusted metal should be considered as no metallic.

**Sample**

- Ice
- Water
- Glass <->
- Headlight glass
- Windows glass
- Bottles glass
- Pexi glass
- Plastic <->
- Milk

**Sample exception**

- Ruby
- Crystal
- Diamond

**Metallic**

Colored

Iron  
Cobalt  
Aluminium  
Silver

Specular color for metal generally match what you see  
Pure/polished/perfect metal have a black diffuse  
Impure/worn metal can add little diffuse color into the mix

**Sample**

- Gold
- Silver
- Aluminium
- Iron
- Copper
- Titanium
- Nickel
- Cobalt
- Platinum

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**Roughness (RGB)**



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<https://www.youtube.com/user/3dsmaxtrainer>



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