Lunar Garde's Cel Shader

To use, place at least one CelShade light into the scene, and assign CelShade material instances to any meshes that you want to have cel-shaded.

Each light should be on its own channel. Channels can be enabled or disabled per material instance. By default, up to 8 lights can be used in one scene, though more channels can be added in the MergeCelLightCHannels material function.

Light color and intensity can be specified per light. Light range can be infinite or have a specified limited range, optionally with a linear falloff if desired.

The "Disable Film Tonemapper" option may help colors be more accurate and more vibrant if they look dull or washed out by default.

Please note that all shadows from this system are based on light angle and cannot receive shadows cast by itself or other objects. Cast shadows are strictly based on UE4's lighting.

Light Types

Directional Light - Shades meshes based on light angle. You'll most likely want to use one of these for the whole scene.
Point Light - Shades meshes based on light location
Spot Light - Similar to a point light, but it only shines within a limited angle
Area Light - Light that fills the area. Good for tinting an area with color.
Shadow Light - Only affects parts of a mesh that are not lit by any directional/point/spot light. It can be used to color shadows, as well as lighten or darken them.

Cel-Shader Material Instance

There are many options to experiment with. I'm not listing them all, but I'll point out some of the less obvious or more noteworthy options.

- Texture, color, and brightness are independently controllable for the base color, shadow, and specular
- Shadow and specular thresholds can each be controlled with either a vertex color channel, or using a texture color channel. This is similar to a technique used by some Arc System Works games such as Guilty Gear Xrd, and it allows the artist to have more control over what parts of the mesh are shadowed, lit, or highlighted
- Shadow/specular each have hardness options, if you don't want completely hard shading

- Diffuse Color is black by default, which means it has no influence, and the material is effectively unlit with only emissive color. By setting this to white, it has full influence, which allows it to be affected by UE4's lights. This is necessary to receive cast shadows, as emissive color cannot receive shadows
- "Lit Color" and "Light Intensity Multiplier" specifically affect parts of the mesh that are lit by any light other than shadow light. This can be used to make the light appear brighter while maintaining high contrast with the shadow
- The "Use Word Space Normal" option tends to result in flatter shading from UE4's lights, although it can cause some lighting artifacts, especially if using metallic/specular values other than 0 in the diffuse section. This option is useful if you want flat shading but still want to receive cast shadows. However, this will also affect normals for the cel-shading, so you typically want to also enable "Use Vertex Normal" if you enable this
- Fresnel adds a sort of "edge light", which has its own brightness/color options, though by default, it is affected by light color/brightness. Negative fresnel brightness will darken the color. For example, a white fresnel with negative brightness will appear black. This can also be used as a sort of outline

Outlines

An Inverted hull outline is basically a duplicate mesh with inverted normals. It doubles the geometry, which is something to keep in mind for performance.

- There are two master materials for inverted hull outlines: M_Outline_master and M_Outline_TwoSided_master
- The main outline material is one-sided and is meant for meshes that have an inverted hull built in, so they do not require a second mesh
- The two-sided one is for meshes that don't have a hull built in. It is meant to be used on a copy of the primary mesh, which overlaps the primary mesh. For a skeletal mesh in a blueprint, you can bind its animations to the main mesh by using the "Set Master Pose Component" node
- These outlines scale with camera distance, which have distance scale and minimum thickness values that can be adjusted in the material instance
- Line thickness can also be offset using either a vertex color channel or a texture color channel. Arc System Works also uses a similar technique. This gives the artist more control over line thickness
- Line color and brightness can also be configured, and a texture can also be added, for example to add colored outlines that are just the base texture but darker
- With the noise options, a texture can be added to to vary line thickness for a more stylized outline. It can also move to give the effect of a shaking outline

A post-process outline is also included. It lacks the noise and offset options, but it's easier to use if you want to apply it to the whole scene and more performant since it doesn't double geometry. It can be applied to the whole scene, only to custom depth, or exclude custom depth